hp server rx4610
User Guide

Version 0501

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Audience Assumptions

This guide is for the person who installs, administers, and troubleshoots LAN servers. Hewlett-Packard Company assumes you are qualified in the servicing of computer equipment and trained in recognizing hazards in products with hazardous energy levels.

Contents

1 Controls, Ports, and Indicators

Introduction

Before operating the Server, familiarize yourself with the HP Server's controls, ports, and indicators, as shown in Figures 1-1 through 1-8.

Front Panel

The front panel of the HP Server provides the controls and indicators commonly used when operating the HP Server.

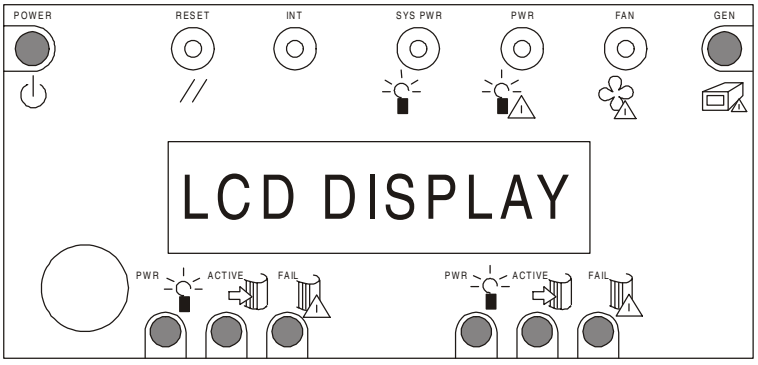


Figure 1-1. Front Panel

Table 1-1 provides the front panel power switch and its associated LED indicator definitions.

Table 1-1. Control Panel Switch and Indicators

Control / Indicator	Description
Power On/Off	This button turns the HP Server power On or Off. The +12 V standby voltage is On whenever the server power cords are plugged in.
Reset	When pressed, it resets the server and causes the power on self-test (POST) to run.
INIT	When pressed, the system performs a crash dump provided the dump is supported by the operating system.
System Power LED (Green)	When lit continuously, it indicates the presence of DC power in the server. When not lit, it indicates power is turned off or the power source is disrupted.
Power Fail LED (Amber)	When lit continuously, it indicates a power failure.
Fan Fail LED (Amber)	When flashing, it indicates a fan failure.
General Fault LED (Amber)	When lit continuously, it indicates a hot plug PCI fault.
Front Panel LCD	It displays information about the processor type and the POST codes.

Additional Front Panel Controls and Indicators

The input and storage devices provide additional front panel controls and indicators, which give control and operational status to the respective device.

DVD Drive

The server supports a slimline IDE DVD drive. This peripheral mounts directly above the top-left power bay on the front of the chassis. The drive is mounted on a removable tray that facilitates system assembly and service.

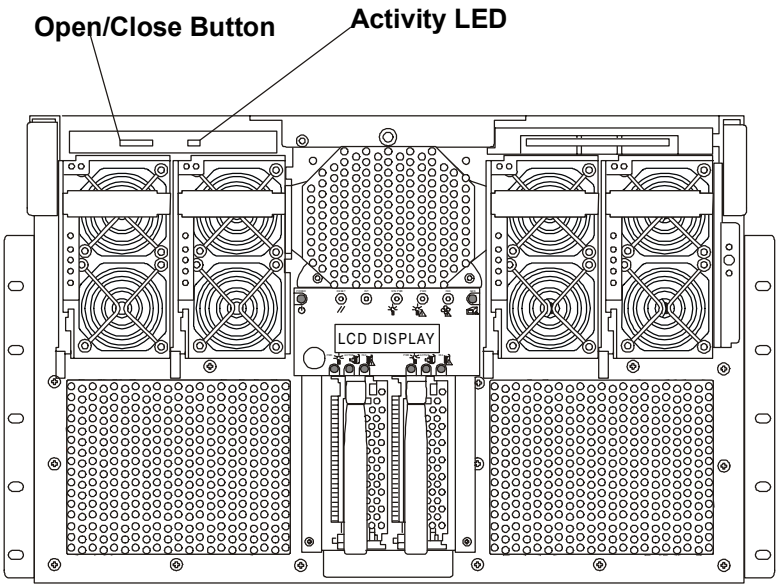


Figure 1-2. DVD Drive

Table 1-2. HP DVD Drive

Control Indicator	Description
Open/Close Button	When pressed, it opens or closes the DVD tray.
Activity LED	When lit, it indicates the drive is in use.

Diskette Floppy Drive

The server supports a slimline IDE diskette drive for 1.44 MB and 120 MB media. This half-inch slimline peripheral mounts directly above the top-right power bay on the front of the chassis. The drive is mounted on a removable tray that facilitates system assembly and service.

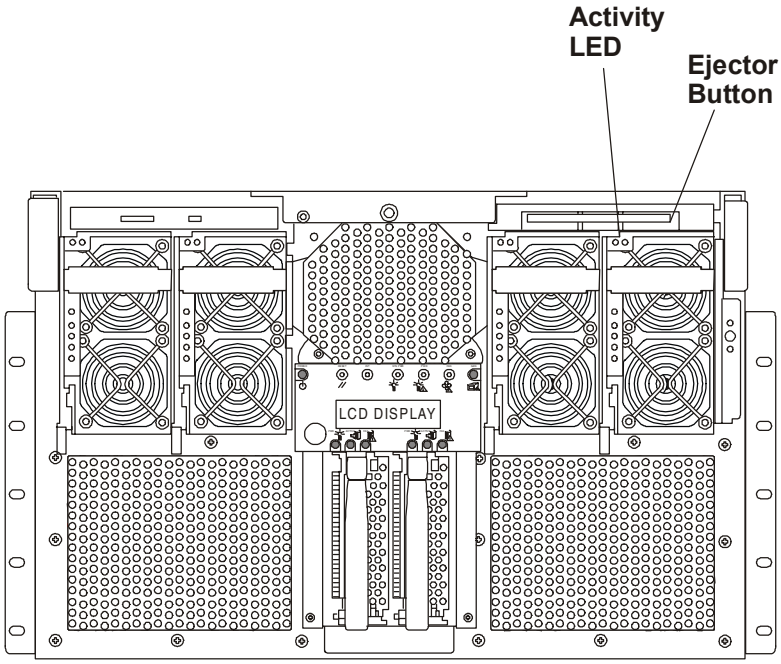


Figure 1-3. Drive

Table 1-3. Floppy Diskette Drive

Control Indicator	Description
Activity LED	When lit, it indicates the drive is in use.
Ejector Button	When pressed, it ejects the diskette.

SCSI Hard Drives

The server supports up to two hot-swap drive carriers containing standard 1-inch high by 3.5-inch-wide LVDS SCSI hard drives. As part of the hot-swap implementation, drive carriers with integral heat sinks house the drives. Each drive is mounted in a carrier with four fasteners and the carrier snaps into the hard drive bay. When a carrier is seated properly in the bay, it snaps into place and leaves the locking handle exposed to the front of the chassis. Drives can consume up to 24 watts of power and must be specified to run at a maximum ambient temperature of 40 ° C (104 ° F).

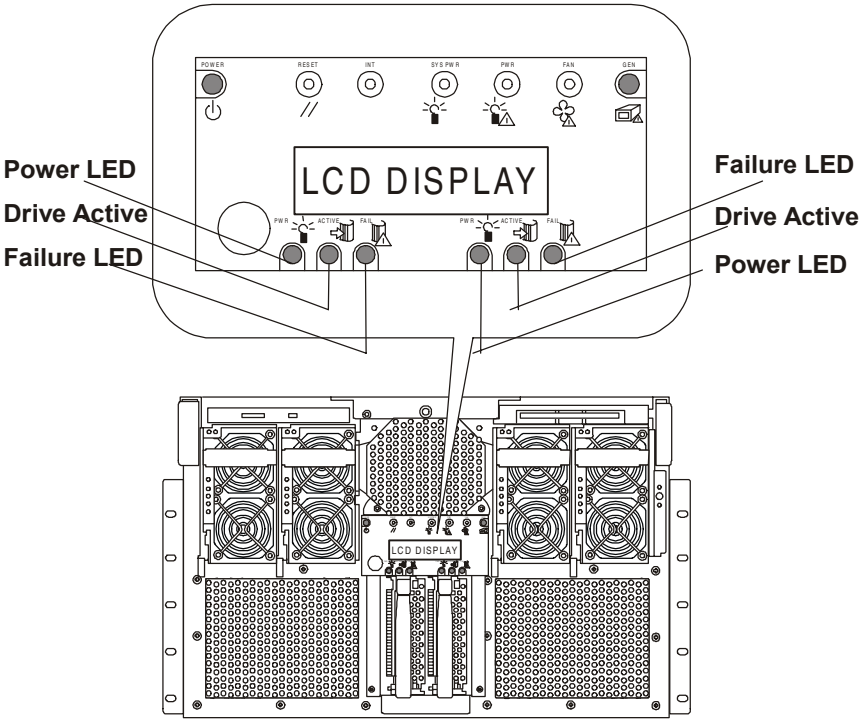


Figure 1-4. SCSI Drive Indicators on the Front LED Panel

Table 1-4. SCSI Drives

Control Indicator	Description
Drive Power LED (Green)	When lit continuously, it indicates the presence of the drive and power to the drive.
Drive Active LED (Green)	When lit, it indicates drive activity.
Drive Fail LED (Amber)	When lit continuously, it indicates an asserted fault status on one or more hard disk drives. When flashing, it indicates a drive reset in progress.

Power Supplies

The chassis can be configured with three to four power supplies. Each power supply has a dual rating of 800W minimum over an input range of 180-264VAC and 700W minimum over an input range of 90-132VAC. Each supply is designed to minimize EMI and RFI. Each power supply also has self-contained fans for cooling.

The DC output voltages of each power supply are:

- +48 V
- +12 V standby

Each supply docks into a 28-pin connector on the front of the Power Distribution Board (T-Docking board).

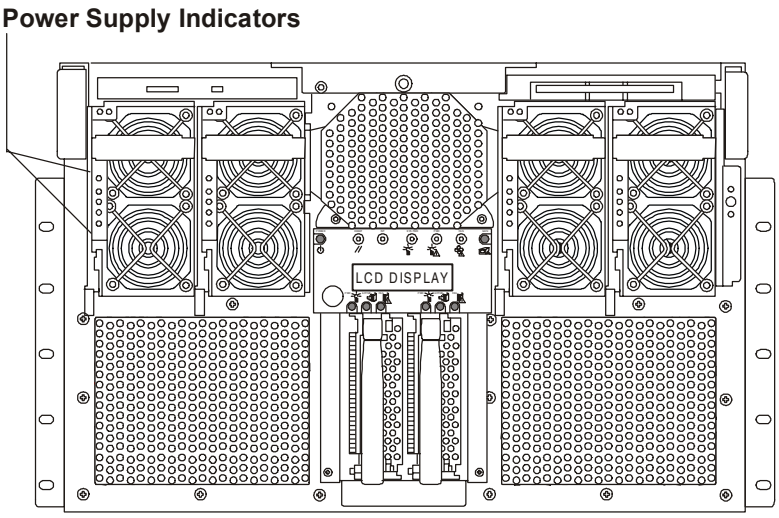


Figure 1-5. Power Supply Indicators

Table 1-5. LEDs for Power Supplies

Control Indicator	Description
Power LED (Green)	When lit continuously, it indicates the power supply DC outputs are on and OK. Blinking indicates the power supply is on standby. Off indicates there is no power to the power supply.
Predictive Fail LED (Amber)	A blinking LED indicates that the power supply will soon fail.
Fail LED (Amber)	When lit continuously, it indicates that the power supply has failed and is not supplying output. When blinking, it indicates that the power supply has reached its current limit.

Rear View

The ports and connectors at the rear are listed below and shown in Figure 1-6. Figure 1-6 provides a detailed view of the Legacy I/O panel that resides in the upper-right corner of the rear panel.

- The power connector accepts a standard power cable to connect the HP Server with the site power supply.
- Ten PCI add-in board expansion slots are available. Eight are hot plug and two are non-hot plug.
- Each hot plug PCI has status LEDs.
- The mouse port accepts a standard mouse with a PS/2 connector.
- The keyboard port accepts a standard keyboard with a 6-pin PS/2 connector.
- Two USB ports, 0 and 1, with 4 pin connectors are provided for printers, scanners, and external modems.
- The LAN port is included as an embedded controller based on Intel's 82559 10/100 BaseT Fast Ethernet controller. It has a RJ-45 LAN connector and two LEDs to indicate LAN speed and valid connection.
- The two Serial Ports are standard 9-pin RS-232 connectors.
- The Parallel Port is a standard PS/2 compatible parallel port with a 25 pin bi-directional subminiature D connector.
- There are two Interchassis Management Bus (ICMB) connectors, ports 1 and 2.
- The 15 pin video connector is Super VGA compatible.
- The optional external SCSI port provides access to external SCSI devices.

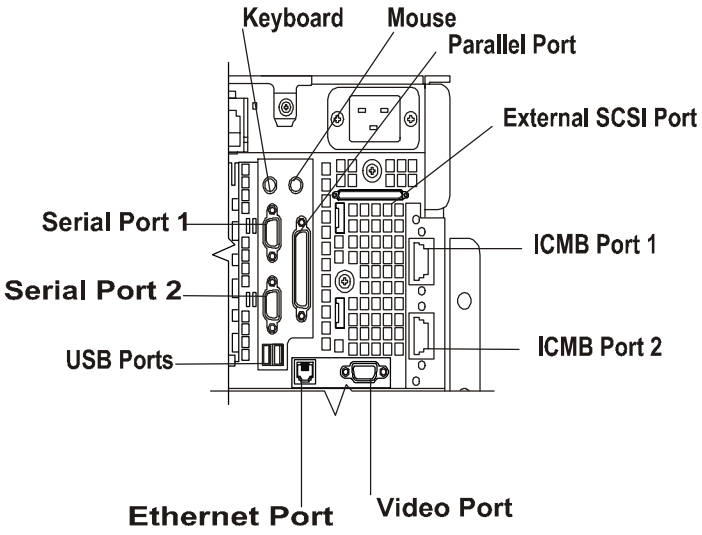


Figure 1-6. Rear Panel and Ports

Legacy I/O Panel

This board contains all legacy I/O connections and plugs into an edge connector on the I/O baseboard.

NOTE	The keyboard and mouse connector must be plugged into the correct ports or the server will not boot.

PCI LEDs

Each PCI slot has four indicator LEDs: two on the outside and two on the inside of the system. The two LEDs for each slot: one amber and one green are visible from the rear (also inside) of the HP Server, as shown in Figure 1-7. Eight of the ten PCI slots can be individually powered down through the respective NOS or supported GUI utility, without powering down the entire HP Server, if the board has a Hot Plug compliant driver.

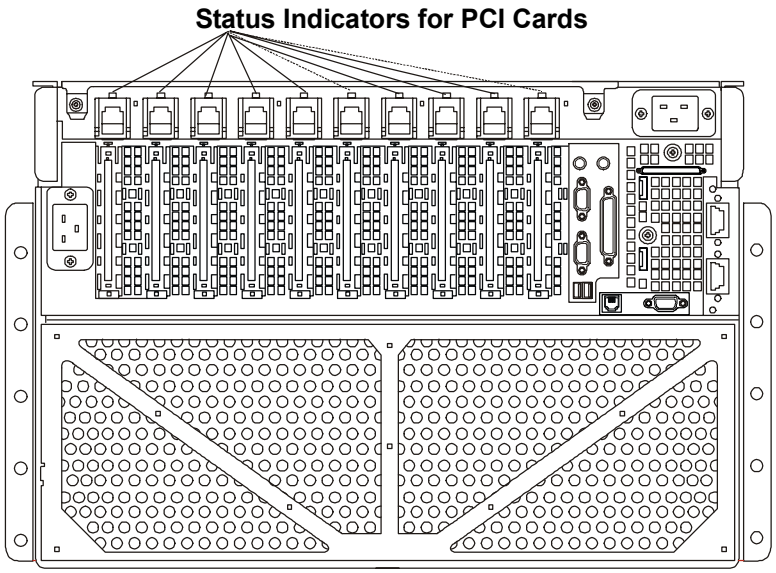


Figure 1-7. Status Indicators for PCI Boards

Applying Power to the HP Server

Before applying power to the HP Server, verify that the keyboard and mouse are connected to the proper ports. The server will not boot without these devices. Turning on the monitor prior to powering on the HP Server allows proper auto-configuration of the video output as it boots.

Powering-Up the HP Server

To power-up the rx4610, complete the following procedure:

NOTE	Turn on power to the monitor connected to the HP Server before you power-on the Server. This allows proper auto-configuration of video output of the Server as it boots.

1. Make sure that the monitor, keyboard, and mouse have been connected to the proper ports on the rear panel of the server.
2. Remove the drive protection card, if present, from the diskette drive.
3. Plug in the power cord for the monitor and turn it on.
4. Plug the female ends of the server AC power cords into the input receptacle on the back of the chassis.
5. Plug the male ends of the server AC power cords into grounded, three-pronged AC power outlet.
6. Slide the server into the rack.
7. If the server does not come on when you plug it into the AC outlet, press the on/off power switch on the front panel.
8. Verify that the power-on light on the front panel is lit. After a few seconds, the power-on self test (POST) begins.

   When you press the power button on the control panel, the Server powers up and loads the operating system. The system runs a set of power on self tests (POST) during this process. For details refer to Chapter 11, "Troubleshooting."

Powering-Down the HP Server

To power-down the HP Server, complete the following procedure:

1. Log off all users and, if necessary, back up the system files.
   - ◊ Schedule the power down for a time when the Server being down will affect the fewest users.
   - ◊ If you will be doing any kind of hardware or software upgrade, ensure the Server's data has been backed up.
   - ◊ Follow instructions in your network operating system (NOS) documentation to gracefully shut down all networking software and applications.

WARNING	The power supply will continue to provide standby current to the HP Server until the power cable is disconnected from the rear panel.

2. Logoff and exit the operating system. The following prompt appears:

   ```
   Shell>
   ```

3. At the Shell> prompt, press and hold the Power button for several seconds. Holding the Power button in for several seconds will power down the server.
4. Disconnect the power cords from the power source.

   Normally this completes the power-down procedure.

Connecting AC Power to Multiple-Server Configurations

The HP Server temporarily draws a large "inrush current," when first connected to an AC power source. This also occurs when the Server is in a standby mode (power is turned off, but the power cord is plugged into AC power). The inrush current is much greater than the Server's normal operating current and generally, the AC power source can handle the normal inrush current.

However, if you install several HP Servers on one circuit, precautions are necessary. If there is a power failure and power is then restored, all the servers immediately begin to draw inrush current at the same time. If the circuit breakers on the incoming power line have insufficient capability, the breaker may trip and thus prevent the servers from powering up.

2 Opening and Closing the HP Server

Introduction

This chapter describes how to remove and replace the front bezel and the HP Server's main cover.

Mounting the Front Bezel

The front handles, if not already installed on the HP Server, should be attached to the front of the HP Server before mounting the bezel.

1. Place the handles into the slots on the front of the HP Server on each edge, as shown in the figure below.
2. Insert the screws through the bracket into the top hole of each group of three holes on the front sides of the HP Server. Repeat this procedure for both handles.
3. Hold the bezel in front of the HP Server.
4. Press the bezel firmly into place.

   You should hear several clicks as the bezel snaps into place on the bracket.

Removing and Replacing the Front Bezel

The bezel is packed in the top tray.

1. To remove the bezel, pull it straightforward off the chassis.

   This exposes the power supplies, mass storage devices, and fans.
2. To replace the bezel, press it back onto the chassis, allowing it to snap into place. See Figure 2-1.

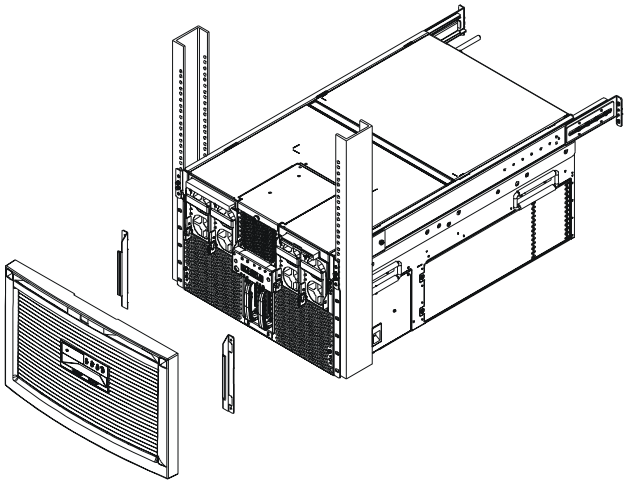


Figure 2-1. Removing and Replacing the Front Bezel

Removing and Replacing the HP Server's Main Cover

The server comes with a removable top cover. Removal of this cover is necessary when installing or removing many components. You do not have to remove the top cover when removing or installing PCI hot plug and non-hot plug adapter boards, the Legacy I/O board, fans, hard drives, power supplies, or components inside the Processor/Memory Complex.

WARNING	Before removing the cover, always disconnect the power cord and unplug the Ethernet cables. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. Make sure that the rack is anchored securely so that it does not tip when the server is extended from the rack.

CAUTION	For proper cooling and airflow, do not operate the server with the cover off. Always reinstall the cover before turning on the server.

Tools Required

The following tools may be required to remove and replace the cover.

- Phillips screwdriver #2 (cross-head)
- Small flat-bladed screwdriver
- Jumper removal tool
- Anti-static wrist strap

Removing the Top Cover

To remove the cover, follow these steps:

1. Turn off all peripheral devices connected to the server.
2. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds.
3. Disconnect the power cords and any Ethernet line.
4. Pull the server out of the rack.
5. Loosen the thumbscrew at the front of the chassis that secures the 120 mm fan bay and fold the fan cover open.
6. Loosen the two thumbscrews that secure the top cover to the rear of the chassis and fold the rear half of the top cover open.
7. Loosen the screw that secures the non-hot plug PCI adapter board cover and remove that cover.
8. Place your hands on the sides of the chassis near the hinge of the rear part such that your thumbs can aggressively slide the entire top cover toward the rear of the chassis. Sliding the

cover in this direction disengages the hooks on both sides of the top cover from the chassis housing.

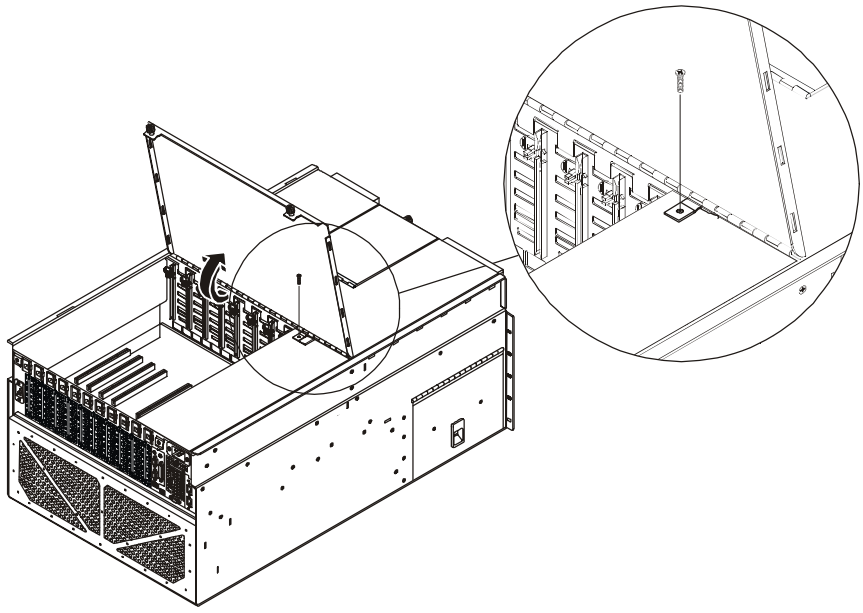


Figure 2-2. Removing the Cover

9. Lift the top cover off the chassis.

Replacing the Top Cover

To replace the cover, complete these steps:

1. Provide ESD protection by wearing an antistatic wrist strap attached to chassis ground of the system when handling components.
2. Before installing the top cover, check that you have not left loose tools or parts inside the system.
3. Check that cables, add-in boards, and other components are properly installed.
4. Make sure that the 120 mm fan cover is lifted and open.
5. Fold the rear part of the top cover open and set it down on the chassis, aligning the hooks on both sides of the front half of the cover.
6. Place your hands on the sides of the chassis near the hinge of the rear part such that your thumbs can aggressively slide the entire top cover toward the front of the chassis. Sliding the cover in this direction engages the hooks on both sides of the top cover into the chassis housing.

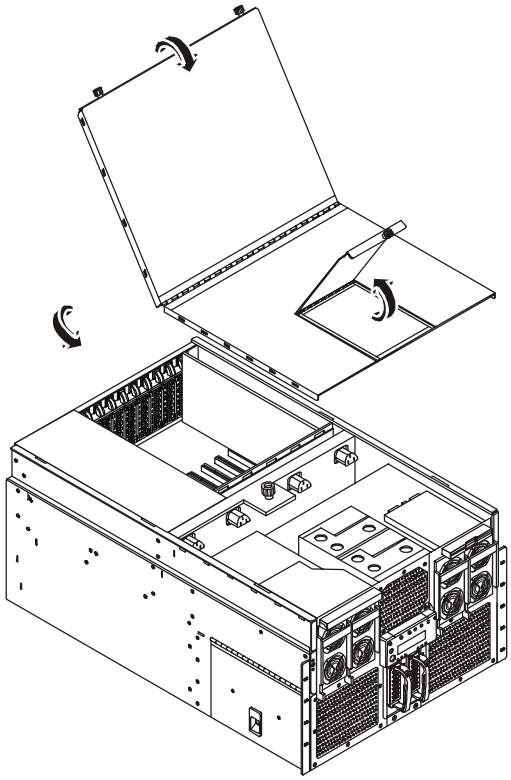


Figure 2-3. Replacing the Cover

7. Close the 120 mm fan cover and tighten the thumbscrew. If the door does not close then the top cover hooks have not fully engaged into the chassis.
8. Replace the PCI adapter board cover and install the screw that secures it to the top cover.
9. Close the rear half of the top cover and tighten the two thumbscrews.
10. Push the chassis back into the rack.
11. Connect the keyboard, mouse, and monitor before powering up the system.
12. Power on any peripherals connected to the server that you shut down.
13. Power on the system.

3 Installing Fans and Power Supplies

Introduction

The fans and power supplies used by the HP Server are hot swappable. The HP Server has four 172 mm fans located on each side of the chassis and two 120 mm cooling fans located on the top front of the chassis. The server has a maximum of four 800 watt autoranging power supplies located in the front of the chassis. This chapter describes the procedures necessary to remove and to replace these components.

Tools and Supplies Needed

- Phillips (cross-head) screwdriver (#2 bit)
- Antistatic wrist strap (recommended)
- Pen or pencil
- Equipment Log

To record the model and serial numbers of the server, all installed options, and any other pertinent information about the server, see Appendix B, "Equipment Log and Configuration Worksheet".

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

Hot Swapping the 172 mm Fans

The four 172 mm cooling fans are mounted in pairs on each side of the chassis. You can hot-swap these fans without turning the server system power off. Each fan uses an amber LED located on the fan's casing to indicate the fan has failed. If it is a failed fan, the amber LED will be illuminated on the front panel, and the amber LED on the failed fan itself will be illuminated. The individual fan LEDs may be seen through view-ports in the fan covers

Removing the 172 mm Fans

To remove the 172 mm fan, complete the following steps:

1. Observe all standard safety and ESD precautions.
2. Slide the server out of the rack far enough to expose the fan-access doors near the front sides of the chassis.

CAUTION	Do not leave the door open for an extended time. Cooling of the system could be reduced.

3. Slide the plastic latch on the fan cover upwards and pull the door open.
4. Grasp the fan assembly with the finger holes and pull it out.

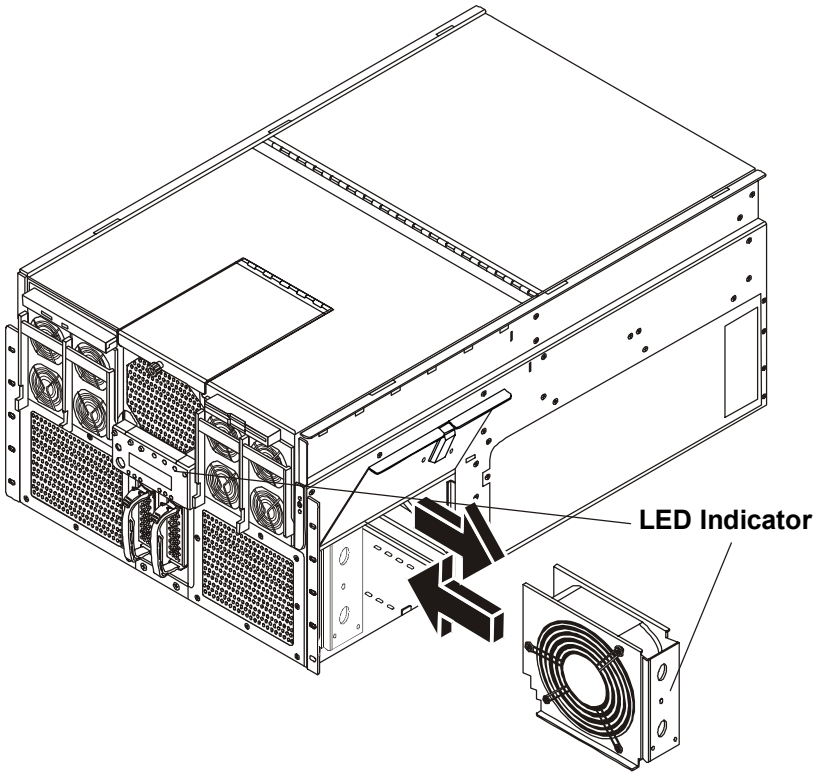


Figure 3-1. Removing the 172 mm Fans

Installing the 172 mm Fans

To install the 172 mm fan, complete the following procedure:

1. Lift the latch on the fan-access door and open the door.

NOTE	Verify the connector orientation prior to installing the new fan.

2. Slide the new fan into place with the connector oriented to engage the socket inside of the fan enclosure.
3. Push the fan assembly firmly into the enclosure to seat the connector.
4. Close the fan-access door and engage the latch by pushing it downward.
5. Slide the chassis back into the rack.

Hot Swapping the 120 mm Fans

The two 120 mm cooling fans are mounted on the top front of the chassis. These fans can be replaced without shutting down power to the system. If it is a failed fan, the amber LED will be illuminated on the front panel, and the amber LED on the failed fan itself will be illuminated. The individual fan LEDs may be seen through view-ports in the fan covers

Removing the 120 mm Fans

To remove the 120mm fan, complete the following procedure:

1. Slide the server out of the rack far enough to expose the fan-access door on the top of the chassis.
2. Unscrew the thumbscrew on the front of the fan-access door and lift the door open. If a fan has failed, the amber LED light is illuminated.

CAUTION	Do not leave the door open for an extended time. Cooling of the system could be reduced

3. Grasp the fan assembly through the finger holes and pull the assembly out.

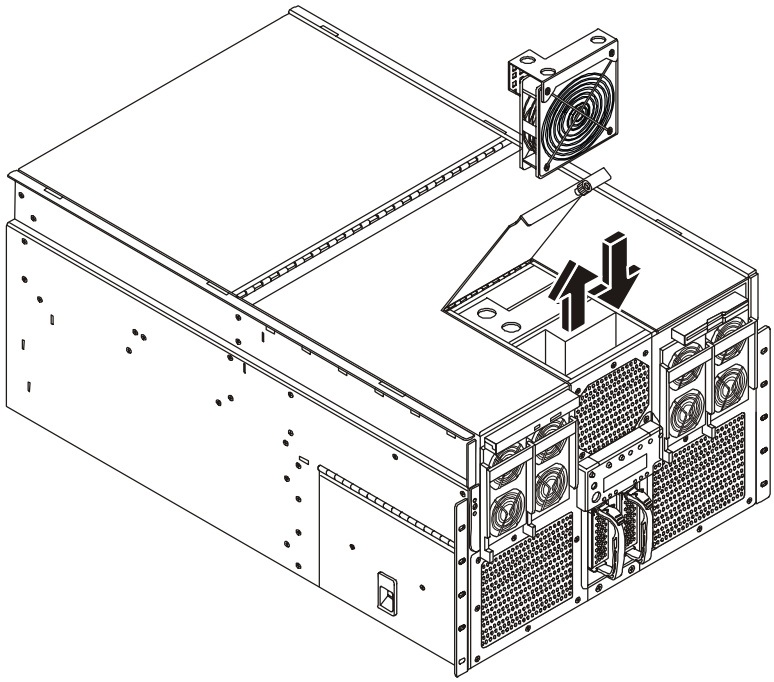


Figure 3-2. Removing the 120 mm Fans

Installing the 120 mm Fans

Follow these steps to install a 120 mm fan:

1. Slide the server out of the rack far enough to expose the fan-access door on the top of the chassis.
2. Unscrew the thumbscrew on the front of the fan-access door and lift the door open.
3. Slide the new fan into place, with the connector oriented to engage the socket inside of the fan enclosure.
4. Push the fan assembly firmly into the enclosure to seat the connector.
5. Close the fan-access door and tighten the thumbscrew.
6. Slide the chassis back into the rack.

Hot Swapping Power Supplies

The power system contains four 800-watt autoranging power supplies. The third bay's power supply from the left as you face the chassis serves a redundancy function for the server's power supply requirements.

CAUTION	Because of chassis airflow disruption, the power supply bay should not be vacant for more than five minutes when server power is on. Exceeding the five-minute limit might cause system cooling to fall below the minimum required level and possibly cause damage to system components.

NOTE	The server requires a minimum of three power supplies to operate. If you have only three power supplies operational, they must occupy the first, second, and fourth power supply bays as you face the chassis. Figure 3-3 shows the power supply installation order.

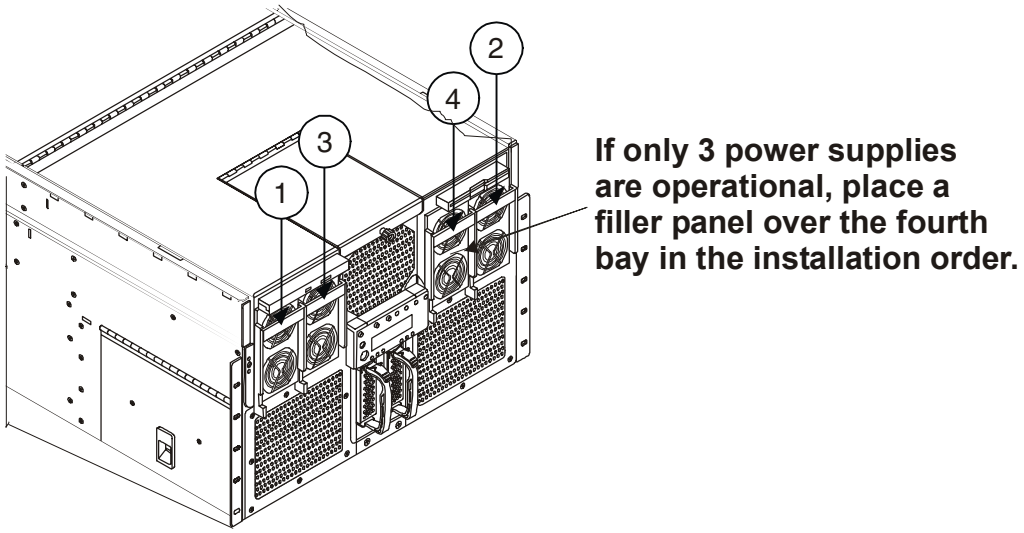


Figure 3-3. Power Supply Installation Order

Determining Power Supply Status

When the amber power supply failure LED on the front of the chassis turns on, determine which power supply is defective by checking the three status LEDs on each supply. Each power supply has three LEDs that both indicate whether power is supplied to the power supply and the health of the power supply. The LEDs are ordered top to bottom on each power supply. Table 3-1 illustrates the states indicated by the three LEDs.

Table 3-1. Power Supply LEDs

Power Supply Status	PWR (Green) (Top Position)	PFAIL (Amber) (Middle Position)	FAIL (Amber) (Bottom Position)
No AC power to any power supplies	Off	Off	Off
No AC power to a specific power supply	Off	Off	On
AC present / Standby output on	Blinking	Off	Off
DC outputs on and okay	On	Off	Off
Power supply failure	Off	Off	On
Current limit	On	Off	Blinking
Predictive failure	On	Blinking / Latched	Off

Removing a Power Supply

To remove a power supply, complete the following procedure:

1. Locate the power supply you want to remove.
2. Push the thumb latch to unlock the power supply handle and pull the handle down to undock the supply.

CAUTION	Any unused power supply slots must be covered with a blanking plug. Uncovered slots can disrupt the air flow used for cooling the system.

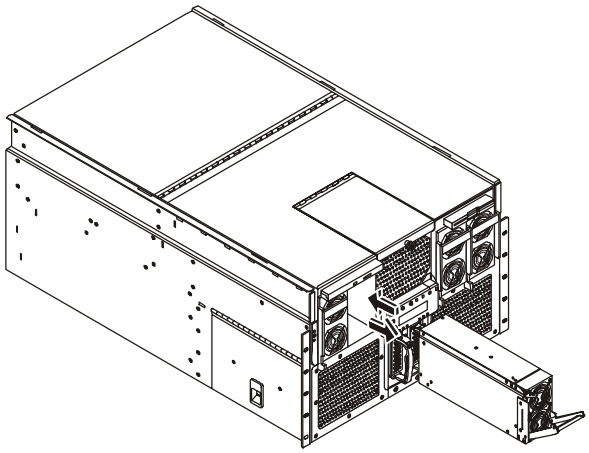


Figure 3-4. Removing a Power Supply

3. Pull the power supply straight forward, out of the chassis. Set it aside.

Installing a Power Supply

The power supply bay should not be vacant for more than five minutes when server power is on. Disruption of the airflow may cause system cooling to fall below acceptable levels. To install the new power supply, complete the following procedure:

1. Remove the new power supply from the protective packaging, and place it on an antistatic surface.
2. Record the model and serial numbers of the power supply in your equipment log.
3. With the handle in the open position (pulled down), slide the replacement power supply into the power supply bay until it stops.
4. Rotate the handle up and in to lock the power supply into place.
5. Check the new power supply LEDs to verify proper functioning.

4 Installing Mass Storage Devices

Introduction

The HP Server comes standard with a DVD and a floppy diskette drive. The internal mass storage cages support a maximum of two hot swap drive carriers. Each carrier can house a standard one inch high by three and half inch wide SCSI-2 or SCSI-3 hard drive. The internal SCSI drives are mounted to the carriers using four screws.

Mass Storage Guidelines

- General Guidelines
  - ◊ Use care when unpacking and handling the SCSI disk drives.

    The hard disk drives are very susceptible to mechanical shock and can be easily damaged by a drop as short as one-quarter of an inch. If the drop would crack an egg, it will damage the drive.
  - ◊ Do not stack drives.
  - ◊ The HP Server is internally limited to 2 SCSI disk drives
- IDE Devices
  - ◊ The diskette drive and DVD drive are standard on all models of the HP Server. They are housed in two piece drive carrier assemblies that rest on the chassis surface. They are accessible when the top cover is removed. See Figures 4-3 and 4-4.
  - ◊ The Legacy I/O board contains the PCI-enhanced IDE interface with two IDE buses. The primary IDE 0 bus supports the diskette drive and the secondary IDE 1 bus supports the DVD drive.

    Refer to "System Board Layout" in Appendix A, "Specifications."
- SCSI Device Selection
  - ◊ A Qlogic ISP12160A Ultra3 SCSI chip is a highly integrated bus master, dual-channel SCSI I/O processor for SCSI initiator and target applications. The chip supports dual channel, Ultra3 (160) SCSI functionality and is pin compatible with QLogic's ISP12160 Ultra3 SCSI processor as well as QLogic's ISP1280 dual SCSI processor.
  - ◊ Use only low-voltage differential (LVD) SCSI devices.

Boot Priority

The HP Server's boot order should be considered when selecting a PCI slot on the system board. This is especially important if you are installing a board that requires an early number in the boot order. The board's boot priority is set by its slot location in the boot order.

By default the HP Server searches for boot devices in this order:

1. SCSI
2. PM
3. SM

4. PS
5. Other Boot Devices

   IDE DVD drive

   Flexible disk drive
6. PCI slot 1
7. PCI slot 2
8. PCI slot 3
9. PCI slot 4
10. PCI slot 5
11. PCI slot 6
12. PCI slot 7
13. PCI slot 8
14. PCI slot 9
15. PCI slot 10

The SCSI controller chip interfaces the PCI bus to two Ultra3 SCSI buses and contains an onboard RISC processor. The RISC processor is a fully autonomous device, capable of managing multiple I/O operations and associated data transfers from start to finish without host intervention. It provides power management feature support in accordance with the PCI Bus Power Management Interface Specification.

NOTE The boot order can be changed using the Server's (BIOS) Setup Utility and the Qlogic SCSI Utility. Refer to Chapter 10, "Configuring the HP Server" for more information.

Tools Required

The following tools are required for the removal and installation of mass storage devices in the HP Server:

- Phillips (cross-head) screwdriver (#2).
- Small flat-bladed screwdriver.
- Jumper-removal tool or needle-nosed pliers.
- Antistatic wrist strap and conductive foam pad (recommended).
- Pen or pencil.
- Equipment log: to record the model and serial numbers of components.

Installing a Hot Swap Hard Drive

The HP Server supports a variety of single-ended SCSI SCA-type hard disk drives. The area of the chassis below the system's controls and indicators on the front panel houses up to two 3.5-inch bays. Each bay can contain a single industry-standard SCSI-2 or SCSI-3, one-inch high hard disk drive

from the factory. The procedures in this section describe how to determine drive status, remove a faulty drive, and install a new drive.

Determining Drive Status

Status LEDs arranged in sets of three over each of the two Hard Disk Bays monitor the status of each drive.

Table 4-1. SCSI Drive Status LED Descriptions

SCSI drive present with power on Green LED Left	SCSI drive active Green LED Middle	SCSI drive faulty* Amber LED Right	Description and Action (If Required)
On	Off	Off	Drive is present with power.
On	Blinking	Off	Drive is present with power and is being accessed.
Off	Off	On	Steady amber fault light indicates drive has a problem.
On	Off	Slow Blinking	Drive SHOULD NOT be replaced at this time. A slowly blinking amber fault light indicates that a drive that has just been replaced is in recovery mode (drive array being rebuilt). Power to drive is on.
Off	Off	Off	There is no drive installed in the bay.

Removing a Hard Disk Drive

To remove a hard disk drive from the disk bay, complete the following procedure:

1. Look at the amber LEDs above the hard disk bays to determine which drive is bad. See Table 4-1 for information on how to interpret the LEDs.
2. Remove the plastic bezel on the front of the server.
3. Depress the drive carrier latch of the bad drive, and use the handle to pull the assembly toward you to disengage the drive from the backplane connector.

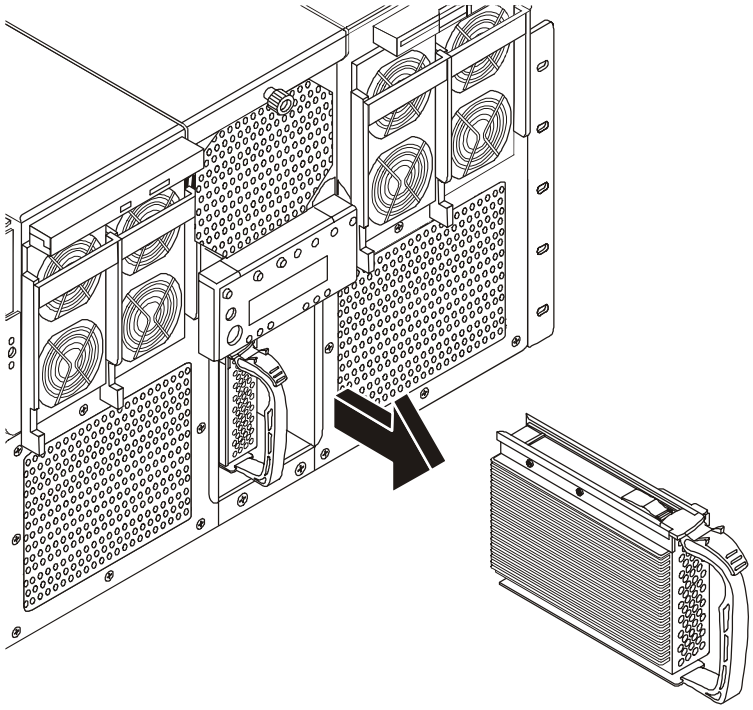


Figure 4-1. Removing a Hard Disk Drive

4. Carefully slide the assembly out of the bay, and place it on an antistatic surface.

Installing a Hard Disk Drive

Hard disk drives are packaged in their drive carriers for immediate installation. They require no assembly and may be installed without the use of any tools. To install the hard disk drive, complete the following procedure:

1. Remove the plastic bezel on the front of the server.
2. Orient the new drive's carrier and drive assembly in front of the bay guide rails so that the latch is toward the top. Make sure that the carrier is placed correctly into the guide rails to avoid damage.

CAUTION	Do not press on the perforated metal bracket of the carrier when you push the assembly into the bay, or you may damage the metal fingers of the bracket.

3. While grasping only the drive carrier handle, firmly push the assembly into the bay until the drive docks with the backplane connector and the carrier latch locks.

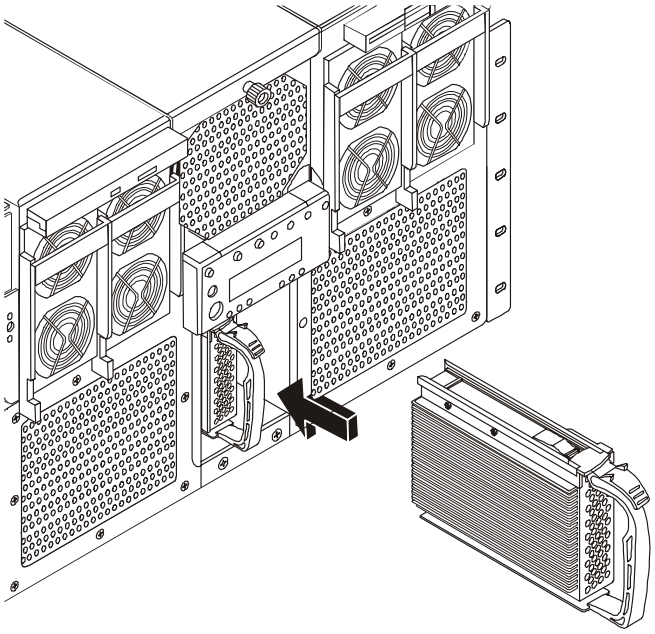


Figure 4-2 Hot Swapping a SCSI Drive

4. Replace the plastic bezel on the front of the server.

Installing Non-Hot Swap Drives

The HP Server supports a slimline IDE diskette drive for 1.44 MB and 120 MB media and a DVD drive. Both drives are part of the standard configuration and mount directly above the power bays on the front of the chassis. The drives are mounted on removable trays that facilitate system assembly and service. The server must be powered down to install these drives.

Installing the Floppy Disk Drive

The floppy disk drive is housed in a two-piece drive carrier assembly that rests on the chassis surface. The assembly is accessible when the top cover is removed. The following procedures describe how to remove and install the drive.

Removing the Floppy Diskette Drive

To remove the floppy diskette drive, complete the following procedure:

1. Observe all safety and ESD precautions whenever you remove the cover from the HP Server.

WARNING	Before removing the top cover, always disconnect the power cord and unplug the Ethernet cables. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. The power switch does NOT turn off the standby power. Disconnect the power cord from the HP Server before handling components.

2. Remove the top cover as described in “Removing and Replacing the HP Server’s Main Cover” in Chapter 2.

3. Disconnect the drive's data and power cables from cable adapter PCB at the rear of the drive.
4. Loosen the thumbscrew found at the rear of the drive carrier assembly.
5. Slide the drive and the drive carrier assembly toward the rear of the chassis so that the front part of the drive clears the opening in the chassis.
6. Remove the drive carrier assembly with the drive in it from the chassis.
7. Place the drive in an antistatic protective wrapper if you are not reinstalling the same drive.

Installing the Floppy Disk Drive

To install the new floppy diskette drive, complete the following steps:

1. Remove the new drive assembly from its protective wrapper, and place it component-side up on an antistatic surface.
2. Record the drive model and serial numbers in your equipment log.
3. Pick up the entire drive carrier assembly, being careful that you keep the pieces together, and place it on the chassis surface just inside the drive slot.
4. Grasp the sides of the drive and drive carrier assembly and slide it forward such that the front part of the drive comes through the opening in the chassis. Make sure that the thumbscrew at the rear of the drive carrier assembly aligns with the hole in the surface of the chassis.

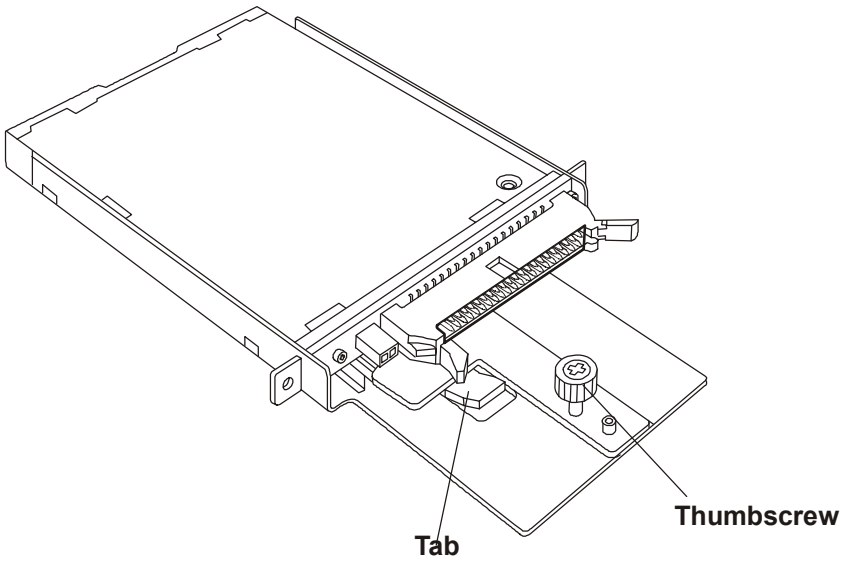


Figure 4-3. Diskette Drive

5. Tighten the thumbscrew at the rear of the drive carrier assembly.
6. Install the drive's data and power cables into the cable adapter PCB.
7. Install the top cover.

Installing the DVD Drive

The DVD Drive is housed in two-piece drive carrier assembly that rests on the chassis surface. The drive carrier assembly is accessible when the top cover is removed. The following sections describe how to remove and install the drive.

Removing the DVD Drive

To remove the DVD drive, complete the following procedure:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the top cover as described in "Removing and Replacing the HP Server's Main Cover" in Chapter 2.
3. Disconnect the drive's data and power cables from the drive cable adapter PCB at the rear of the drive.
4. Loosen the thumbscrew found at the rear of the drive carrier assembly.
5. Slide the drive and drive carrier assembly towards the rear of the chassis so that the front part of the drive clears the opening in the chassis.
6. Place the drive in an antistatic protective wrapper if you are not reinstalling the same drive.

Installing the DVD Drive

To install the new DVD drive, complete the following steps:

1. Remove the new drive from its protective wrapper, and place it face down on an antistatic surface.
2. Record the drive model and serial numbers in your equipment log.
3. Pick up the DVD drive and drive carrier assembly and place it face up (carrier side down) on the chassis such that the front of the drive is aligned with the opening in the front of the chassis.

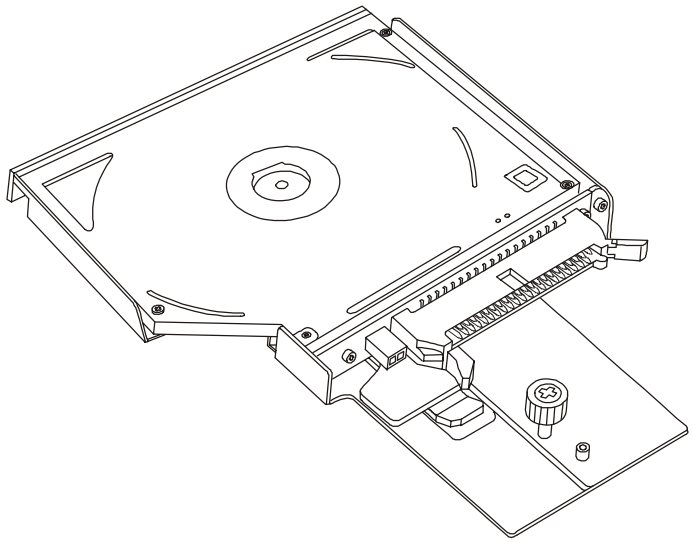


Figure 4-4. Installing the DVD

4. Grasp the sides of the drive and drive carrier assembly and slide it forward such that the front part of the drive comes through the opening in the chassis. Make sure that the thumbscrew at the rear of the drive carrier assembly aligns with the hole in the surface of the chassis.
5. Tighten the thumbscrew at the rear of the drive carrier assembly.
6. Connect the drive's data and power cables.

7. Install the top cover as described in "Removing and Replacing the HP Server's Main Cover" in Chapter 2.

Connecting External SCSI Devices

The second SCSI channel B is connected directly to the external VHD (Very High Density) 68-pin SCSI connector on the rear panel. All external SCSI devices are connected to the HP Server using this external connector, but the external SCSI devices must provide the necessary termination at the end of the SCSI chain. If no external devices are connected, then no termination is required. The internal SCSI controller terminates channel B electrically, if no external devices are sensed at the connector. Please consult the product update information for the latest approved adapters on the following HP website:

http://www.hp.com

Removing and Installing the Hard Disk Bay

The Hard Drive Bay provides mounting features for two hot swap hard drives, the Front Panel Interface board, and the Hot Swap Backplane board. You can easily remove and install the bay from the chassis by removing the front bezel and four mounting screws.

Removing the Hard Disk Bay

To remove the Hard Disk Bay, complete the following procedure:

1. Turn off the system by using the power on/off switch on the front of the chassis and remove both AC power cords.
2. Remove the front bezel.
3. Remove each hard disk drive from the drive bay by first grasping its handle and depressing the drive locking tab, and then sliding the drive out of the bay.
4. Remove the four #2 Phillips screws from the top and bottom of the drive bay.
5. Grasp the bay by the Front Panel display housing and gently pull the drive bay out of the chassis.

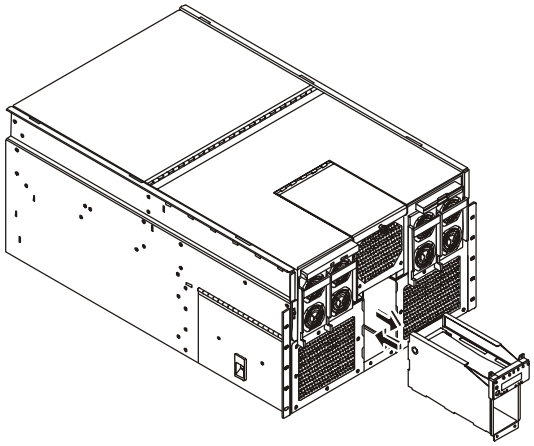


Figure 4-5. Hard Disk Bay

Installing the Hard Disk Bay

To install the Hard Disk Bay, complete the following steps:

1. Turn off the system by using the power on/off switch on the front of the chassis and remove both AC power cords.
2. If the front bezel is not already removed, remove the bezel.
3. Align the Hard Disk Bay such that the connector side is facing into the chassis and push the bay into the front of the chassis.
4. Ensure the drive bay seats into the front connector on the Power Distribution Board (T-Docking Board).
5. Replace the four screws at the top and bottom of the bay.
6. Replace any disk drives into drive bay as required.
7. Replace the Front Bezel.

Removing and Installing the SCSI Backplane

The SCSI Backplane resides on the back of the Hard Drive Bay. It is accessed by removing the Hard Disk Bay.

Removing the SCSI Backplane

To remove the SCSI Backplane, complete the following steps:

1. Remove the Hard Disk Bay as described in "Removing the Hard Disk Bay" earlier in this chapter.
2. Disconnect the LCD panel cable from the SCSI Backplane.
3. Remove the cap stabilizer retaining screw and the cap stabilizer. These two items will be used on the new board.
4. Remove the three screws that secure the SCSI Backplane to the Hard Disk Bay.
5. Carefully place the SCSI Backplane on a clean, anti-static work surface or in anti-static packaging.

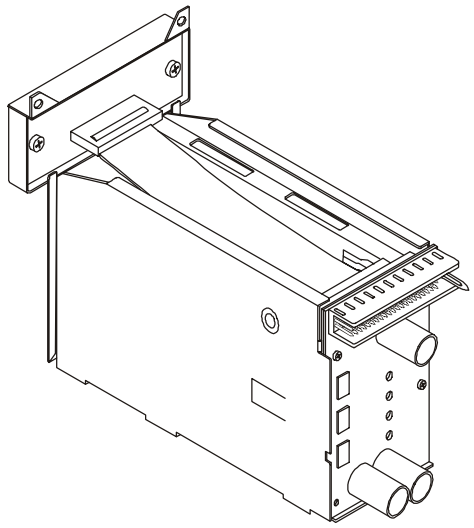


Figure 4-6. Removing the SCSI Backplane

Installing the SCSI Backplane Board

To install the SCSI Backplane Board, complete the following procedure:

1. Carefully align the SCSI Backplane in the slots to the rear of the Hard Disk Bay. Be sure that the four holes in the SCSI Backplane align with the holes and alignment pin in the bay.
2. Secure the SCSI Backplane to the bay by tightening the three screws.
3. Connect the Front Panel cable to the SCSI Backplane. Open the cable connector lock tabs to a 45° angle before inserting the cable.
4. Position the cap stabilizer and secure it with the cap stabilizer retaining screw.
5. Install the Hard Drive Bay as described in "Installing the Bay" earlier in this chapter.

Installing the Front Panel Board

The Front Panel Board displays server information. The module is attached to the front of the Hard Disk Bay, which must first be removed to gain access to the Front Panel Board.

Removing the Front Panel Module

To remove the Front Panel module, complete the following procedure:

1. Turn off the system by using the power on/off switch on the front of the chassis and remove both AC power cords.
2. Remove the Hard Disk Bay from the chassis as described in "Removing the Hard Disk Bay" earlier in this chapter.
3. Disconnect the cable to the Front Panel Board that is attached to the front of the Hard Disk Bay by squeezing the cable retention levers together. You do not have to remove the rear part of the cable.
4. Remove the two screws securing the Front Panel Board to the front panel mounting on the Hard Disk Bay. These screws are located on the inside of the Front Panel Board.
5. Remove the Front Panel Board from the Hard Disk Bay assembly and place it on an ESD protected work surface.

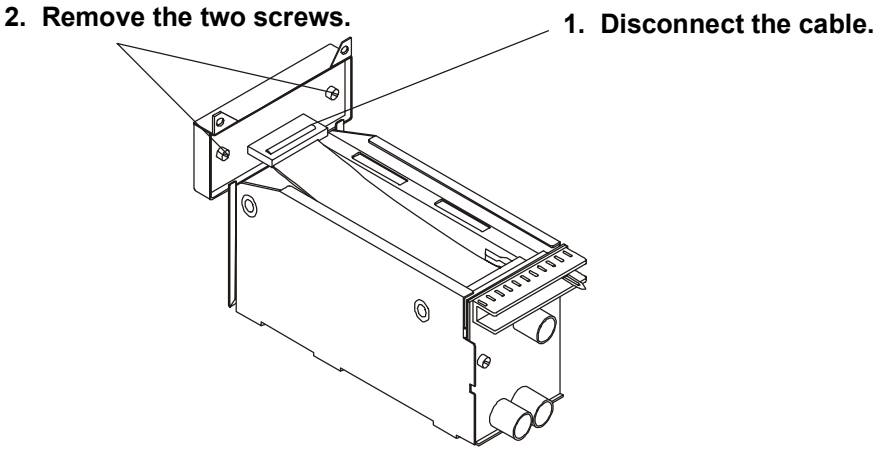


Figure 4-7 The Front Panel Board

Installing the Front Panel Board

To install the new Front Panel Board, complete the following steps:

1. Using two Phillips screws, secure the new Front Panel Board to the Hard Disk Bay.
2. Connect the front part of the Front Panel Board data cable to the connector on the new Front Panel Board.
3. Install the Hard Disk Bay into the chassis as described in "Installing the Hard Disk Bay" above.

5 Installing Additional Memory

Introduction

This chapter provides the procedures for opening the Processor/Memory Complex, installing a memory board, installing DIMMs, and installing memory board DC-to-DC converters.

Tools Required

Use an anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.

Memory Installation Guidelines

Each Memory Board can support from 1 GB to 32 GB. The server supports up to 64 GB of system memory.

- Use only HP DIMMs, which are 3.3V, 168-pin, PC100, buffered SDRAM DIMMs in 256 MB, 512 MB, or 1 GB modules.
- DIMMs must be installed in the order indicated by the numbered slots on the memory board in groups of four. Verify that the same size DIMM is used in any given group of four by using the same HP part number.
- To ensure optimum performance when two memory boards are installed, the memory on each board should be equal.
- Ensure both latches close on the DIMM when completely installed.
- When handling DIMMs, observe anti-static precautions to avoid damage.

Removing the Processor/Memory Complex

The Processor/Memory Complex mounts memory boards to the processor board and forms a module that you can remove from the main system chassis. To access this module, you need to remove the access door on the side of the chassis and remove the four screws on the left side of the chassis to slide the Processor/Memory Complex out of the system.

1. If the system is already installed and working, power down the system. Refer to Chapter 1, "Controls, Ports, and Indicators."

WARNING	The power supply will continue to provide standby current to the HP Server until the power cable is disconnected. Before removing the cover, always disconnect the power cord and unplug the Ethernet cables. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry.

2. Disconnect the power cables and any external cables connected to the system.

   If necessary, label each cable to expedite re-assembly.

WARNING	Make sure that the rack is anchored securely so that it does not tip when the server is extended from the rack.

3. Pull the chassis out of the rack to expose the Processor/Memory Bay on the right side of the chassis as you face its front.
4. Remove the four screws that secure the complex to the chassis. These screws are located on the left side of the chassis as you face the front of the system.
5. Loosen the two-quarter turn screws on the left side of the Processor/Memory Complex cover such that the cover springs open.
6. Grasp the cover and press it back toward the chassis as you shift the cover to the left. Shifting the cover to the left clears the right side of the cover from behind the chassis side.

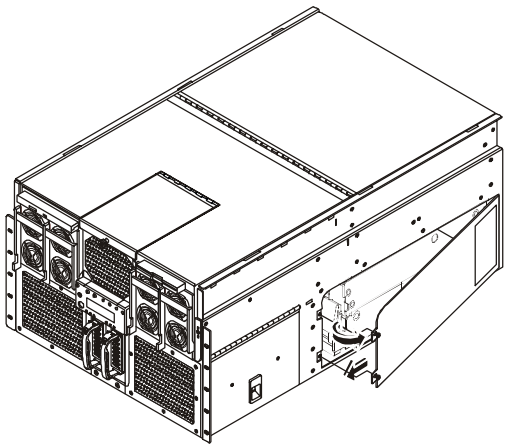


Figure 5-1. Opening the Processor/Memory Complex Bay Cover

7. Once the cover is clear, set it aside.

8. Rotate the two extraction levers on the sides of the module to eject it from the Sideplane board connector.

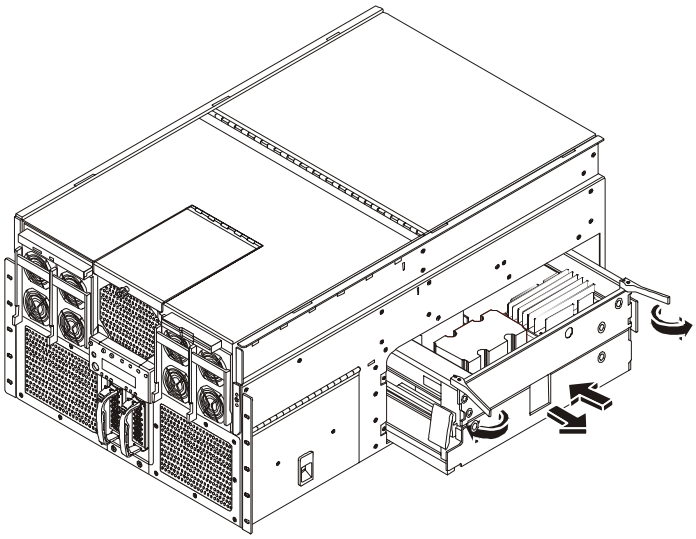


Figure 5-2. Removing the Processor/Memory Complex

WARNING	Fully loaded, the Processor/Memory Complex weighs 36 pounds (16.33 kg). Minimally configured, this complex weighs 24 pounds (10.80 kg). Exercise caution when lifting the complex out of the system.

9. Remove the complex from the bay and place it on a clean ESD protected surface.

Removing the Memory Board DC-to-DC Converters

The Memory Board DC-DC Converters reside on the side of the Processor/Memory Complex inside the system chassis. The server uses four converters to supply regulated power to the system. You can access them by removing the Processor/Memory Complex and working from its side. The Memory Board DC-to-DC Converters must be removed before the Memory Board can be replaced.

To remove the converters, complete the following procedure:

1. Observe the necessary safety and ESD precautions.
2. Remove the Processor/Memory Complex as described in “Removing the Processor/Memory Complex” in Chapter 5.
3. Loosen the slide clamp screw that secures the converters but do not remove it. Loosening the upper screw allows you to remove the upper converters, while loosing the lower screw allows you to remove the lower converters.
4. With the converters to be removed located on the top of the unit, slide the clamp upward that secures that pair of converters.
5. Pull each converter straight out from its socket. Be sure that you keep the converter level as you remove it from its socket. Each converter has a keyed guide that is attached to the side of the Processor/Memory Complex.

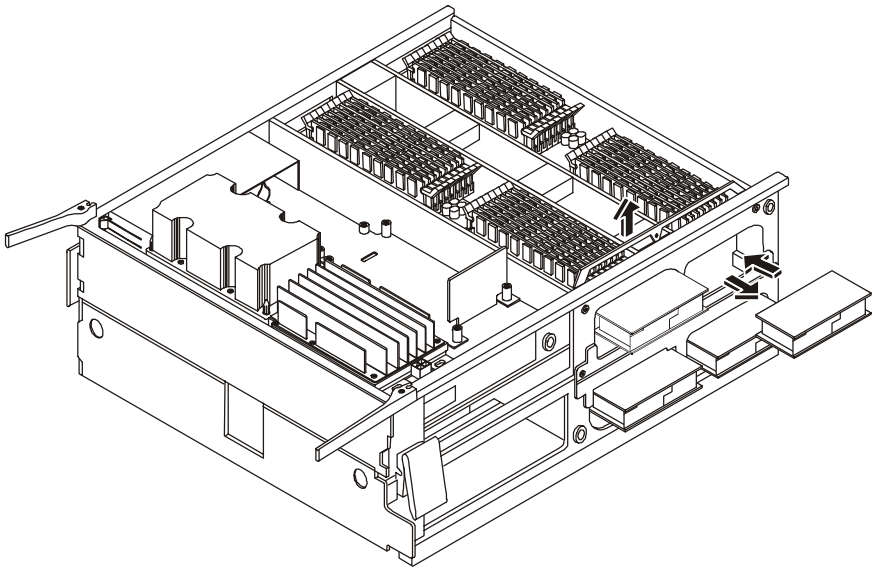


Figure 5-3. Memory Board DC-DC Converters

Removing and Installing Memory Boards

Two Memory Boards reside in the Processor/Memory Complex: one is on top of the complex and the other underneath. You can remove or install these memory boards.

Removing Memory Boards

Two memory boards exist, one plugged in to each side of the processor board (the top and the underside of the Processor/Memory Complex). The following procedure describes the removal process for either memory board. To remove the memory board, complete the following procedure:

1. Open and remove the Processor/Memory Complex.
2. If desired, remove the DIMMs from the memory board you are removing as described in "Removing DIMMs" in Chapter 5.
3. Remove the DC-DC converters from the memory board as described in "Removing the Memory Board DC-DC Converters" in Chapter 5.
4. Loosen the two captive screws holding the sides of the memory board to the processor board. Each of these screws secures a board clamp that runs along the length of the memory board.
5. Lift the board clamps out of the Processor/Memory Complex.
6. Loosen the two captive screws at the end of the handle that spans the middle of the Memory Board.
7. Remove the bracket with the thumbscrew that locks the extraction levers.
8. Pull up on the extraction levers to disengage the memory board from the processor board.

NOTE	Both extraction levers must be raised evenly while disengaging the memory from the Processor Baseboard. The memory board must remain parallel to the Processor Baseboard during extraction.

9. Place the memory board on a clean ESD-protected surface.

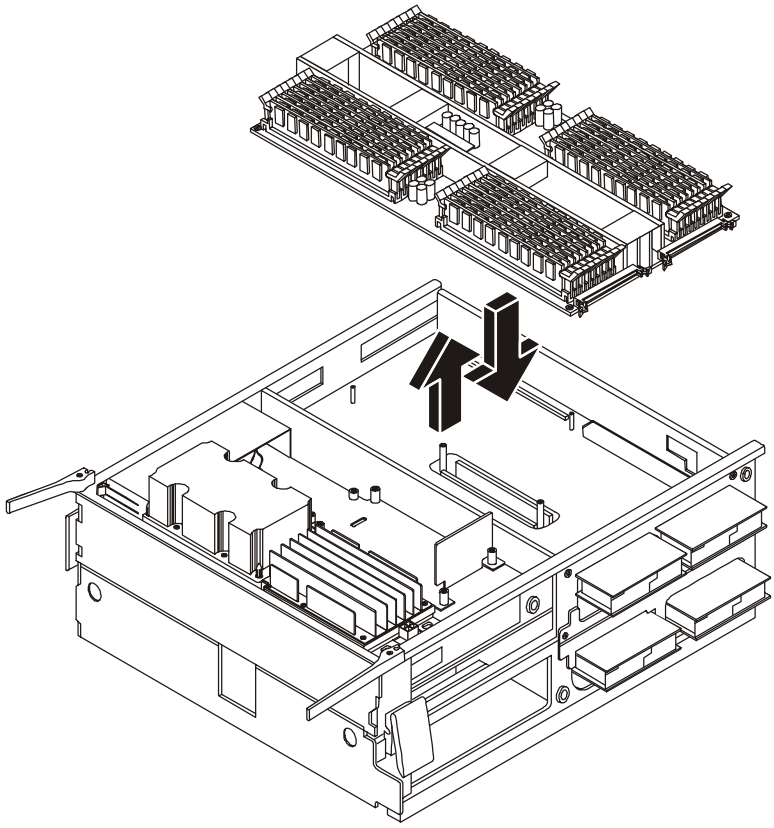


Figure 5-4. Memory Boards

Installing Memory Boards

Two memory boards exist, one plugged into each side of the Processor Baseboard (the top and the underside of the Processor/Memory Complex). This procedure describes the installation process for either memory board. To re-install the memory board or install a new board, complete the following procedure:

1. Observe all safety and ESD precautions.
2. Remove the Processor/Memory Complex as described in "Removing the Processor/Memory Complex" in Chapter 5.
3. With both extraction levers raised to engage the guide pins, place the memory board over the Processor Baseboard connector and guide pins
4. Engage both guide pins at the same time. Ensure that the memory board remains parallel to the Processor Baseboard.

NOTE	Both extraction levers must be depressed evenly while inserting the Memory Board. The Memory Board must remain parallel to the Processor Baseboard during insertion.

5. Slowly depress the levers until the Memory Board connector fully engages.

6. Tighten the two captive screws at the end of the extraction handle.
7. Place the two board clamps along the sides of the memory board such that the screws align with their respective holes.
8. Secure the two board clamps with the two board clamp screws.
9. Place the bracket with the thumbscrew that locks the extraction lever over the extraction levers and tighten the screw.
10. Replace the DC-DC converters as described in “Installing the Memory Board DC-to-DC Converters” in Chapter 5.
11. If you removed any DIMMs replace them as described in “Installing DIMMs” in Chapter 5.

Replace the Processor/Memory Complex as described in “Installing the Processor/Memory Complex” in Chapter 5.

Installing and Removing DIMMs

The BIOS automatically detects, sizes, and initializes the memory array, depending on the type, size, and speed of the installed DIMMs. It reports the memory size and allocation to the system through the configuration registers. DIMMs reside in the Processor/Memory Complex and are accessible inside the server chassis. To remove or install DIMMs you need to access the complex and follow the installation order and groupings required for the DIMMs. It is not necessary to remove the memory board from the complex.

Installing DIMMs

Please refer to the "Memory Installation Guidelines" earlier in this chapter before installing the DIMMs. To install DIMMs, complete the following procedure:

CAUTION	The memory modules are sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the accessory kit: • Leave the memory module in the anti-static container until you are ready to install it. • Always use an anti-static wrist strap and a grounding mat. • Before you remove a memory module from the anti-static container, touch a grounded, unpainted metal surface on the HP Server to discharge static electricity.

1. If the system is already installed and working, power down the system.

   Refer to Chapter 1, "Controls, Ports, and Indicators."

WARNING	The power supply will continue to provide standby current to the HP Server until the power cable is disconnected. Disconnect all power cables before servicing.

2. Disconnect the power cables and all external cables.

   If necessary, label each one to aid in the re-assembly of the unit.
3. Remove the top cover from the HP Server.

   Refer to Chapter 2, "Opening and Closing the HP Server."
4. Observe safety and ESD precautions when working with DIMMs.
5. Expose the memory boards by removing the Processor/Memory complex as described in "Removing the Processor/Memory Complex" in Chapter 5.

CAUTION	DIMM slots on the memory module must be installed only in groups of four.. The number next to each DIMM slot corresponds to installation sequence. DIMMs must be installed by groups of four and must be inserted in the indicated sequence indicated on the memory board.

Remove the DIMM from its antistatic package. Align the two notches in the bottom edge of the DIMM with the keyed socket on the memory board.

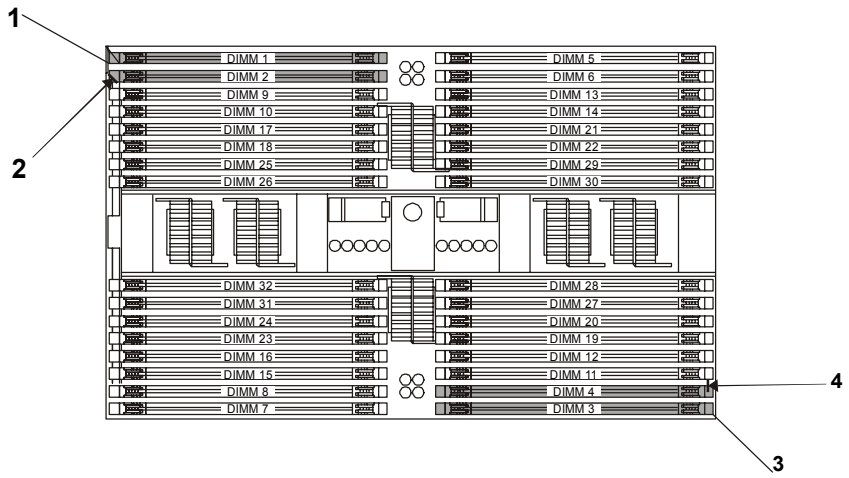


Figure 5-5. DIMM Installation Sequence

7. Insert the bottom edge of the DIMM into the socket and press down firmly until the DIMM is seated correctly.
8. Push the plastic ejector levers on the socket ends to the upright position. Repeat the DIMM installation steps for each DIMM you wish to install.

Removing DIMMs

You may need to remove a DIMM module to downsize your memory configuration or to replace a defective DIMM.

1. If the system is already installed and working, power down the system.

   Refer to Chapter 1, "Controls, Ports, and Indicators."

WARNING	The power supply will continue to provide standby current to the HP Server until the power cable is disconnected.

2. Disconnect the power cables and all external cables.

   If necessary, label each one to support re-assembly.
3. Remove the top cover from the HP Server.

   Refer to Chapter 2, "Opening and Closing the HP Server."
4. Remove the existing DIMM from its socket by gently pushing the plastic ejector levers out and down.
5. Hold the DIMM only by its upper edges, being careful not to touch its components or gold edge connectors. Carefully lift it away from the socket
6. Place the DIMM in its anti-static container.

Installing the Memory Board DC-to-DC Converters

The Memory Board DC-DC converters reside on the side of the Processor/Memory Complex inside the system chassis. The server uses four converters to supply regulated power to the Processor/Memory Complex. You can access them by removing the Processor/Memory Complex and working from its side. The Memory Board DC-to-DC Converters must be installed after the Memory Board is replaced. To install the converters, complete the following procedure:

1. Observe the necessary safety and ESD precautions.
2. Remove the Processor/Memory Complex as described in “Removing the Processor/Memory Complex” in Chapter 5.
3. Carefully align the Processor DC-to-DC converter’s plug with the socket on the Processor/Memory Complex assembly and press it firmly into place. Be sure to keep the converter level such that the keyed guide accepts the edges of the bottom PCB on the converter.
4. Slip the slide clamp up over the converter to secure it in place. Do not tighten the screws until both pairs of converters have been installed.
5. Repeat steps three and four for each DC-to-DC converter you install. If you need to replace converters on the secondary memory board beneath the complex, turn the complex over and then replace the converters.
6. Reinstall the Processor/Memory Complex as described in “Installing the Processor/Memory Complex” in Chapter 5.

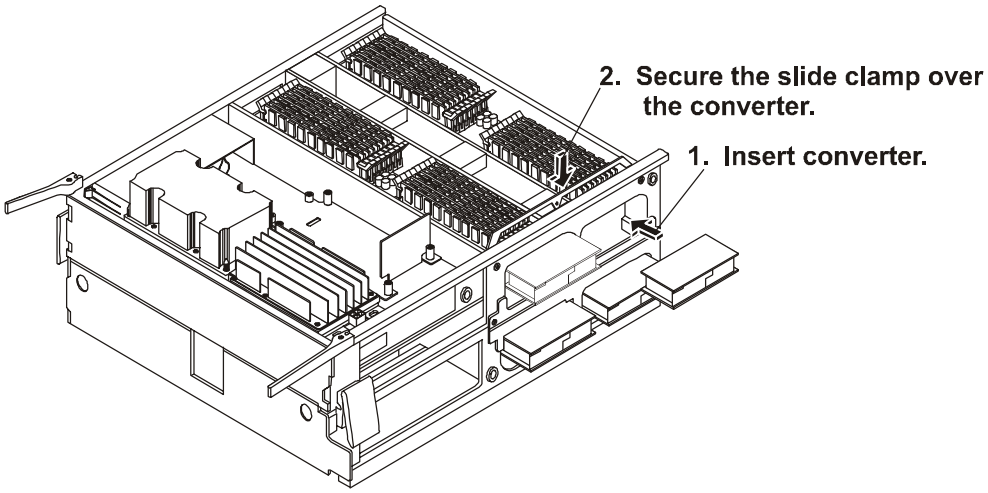


Figure 5-6. Memory Board DC-to-DC Converters

Installing the Processor/Memory Complex

To replace the Processor/Memory Complex, complete the following procedure:

1. Orient the Processor/Memory Complex so that the high density connector is positioned to slide into the Processor/Memory Bay and connect to the Sideplane board.
2. With the two extraction levers on the top and pointed towards you, slide the Complex into the bay.
3. Push the extraction levers toward the chassis so that they are engaged at the same time, seating the Complex into the Sideplane board.
4. Fasten the four screws on the left side of the chassis to hold the Processor/Memory Complex in place.
5. Locate the Processor/Memory Complex Cover and orient it such that the right side of the cover is just to the left of the right side of the bay.
6. Press the cover's edge past the chassis and slide the cover to the right such that the edge of the cover slips in behind the chassis frame.
7. Press the left side of the cover toward the chassis and secure the two screws at the left of the cover.
8. Slide the unit into the rack.

6 Installing an Additional Processor

Introduction

Each processor is packaged in a Slot M pin array cartridge. Depending on the configuration, your system has two to four processors. Each processor is powered by a 48V power pod, located adjacent to the processor on the processor board. Attached to the top of each processor is a heat sink that dissipates thermal energy. CPU thermal dummies must be installed where a processor is absent to properly direct cooling airflow.

Tools Required

The following tools are required to access and install or remove the processors:

- Phillips screwdriver (cross-head with #2 bit)
- Jumper removal tool or needle-nosed pliers
- An anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.
- Equipment Log

Processor Configuration Guidelines

The HP Server supports a variety of processor speeds with an FSB (front side bus) speed of 133 MHz. The HP Server supports processor speeds of 733 MHz and
800 MHz.

CAUTION	Do not open the new processor's protective bag or remove it from the bag until you are ready to install it. Before you remove a processor from the anti-static container, touch a grounded, unpainted metal surface on the HP Server to discharge static electricity.

- Both processors must be the same processor type and have the same product number, which insures the same clock speed, cache size, and FSB speed.
- The processors must operate at the designated speed stated by the product type on the processor.
- If the server has two processors, they must reside on the top half of the Processor/Memory Complex.
- Use only processor upgrade kits with the same HP product number.

  This ensures the processor type, clock speed, and cache sizes are the same.

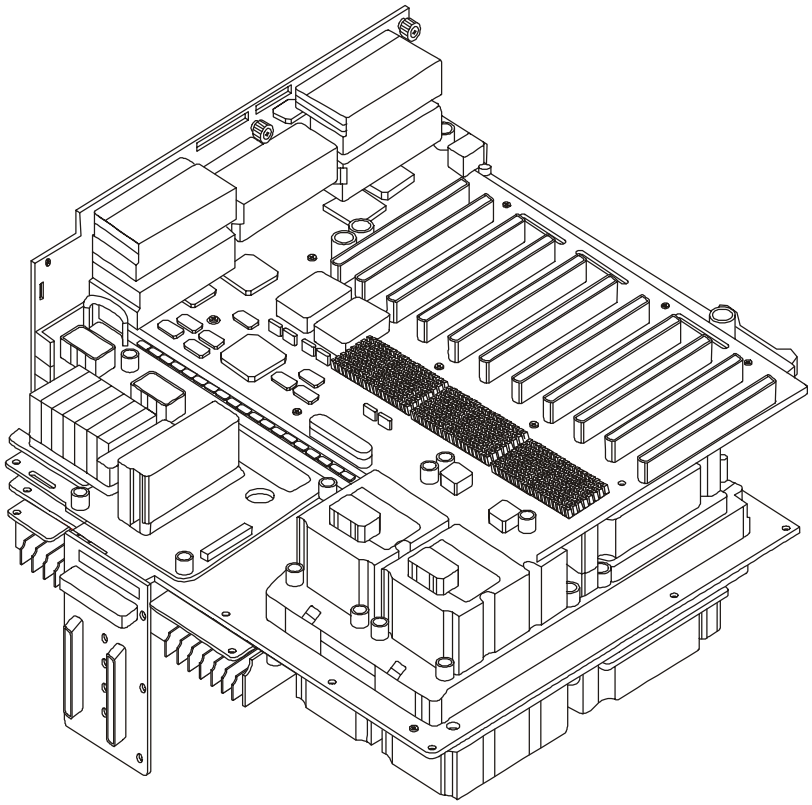


Figure 6-1. System Board Set

Removing the CPU Thermal Dummy

CPU thermal dummies must be installed where a processor is absent to properly direct cooling airflow. Therefore, the CPU thermal dummy must be removed before installing an additional processor.

Complete the following procedure to remove the CPU thermal dummy:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Processor/Memory Complex as described in "Removing the Processor/Memory Complex" in Chapter 5.
3. Orient the complex such that you have access to the surface from which you are removing processors or CPU thermal dummies.
4. Loosen the four captive screws that secure the triple-beam to the sides of the Processor/Memory Complex.
5. Remove the sheet metal baffle located to the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To remove the baffle, press the flexible retaining tabs in as you slide the baffle out. You need this sheet metal baffle out of the way to access some of the captive screws in the next step.
6. Loosen the captive screws in the top of the triple-beam and lift it up and away from the Processor/Memory Complex.
7. Lift the blanks out of the complex.

Installing an Additional Processor

This section provides the instructions for installing an additional processor. If only two processors are to reside in the server, both processors must reside on the top half of the Processor/Memory Complex.

CAUTION	The processor is sensitive to static electricity and can be easily damaged by improper handling. Do the following when handling the accessory kit: • Leave the processor in the anti-static container until you are ready to install it. • Wear an anti-static wrist strap and use a static-dissipating work surface or grounding mat connected to the chassis when handling components. • Before you remove a processor from the anti-static container, touch a grounded, unpainted metal surface on the HP Server to discharge static electricity.

Complete the following steps to install an additional processor:

1. Unpack the processor shipping box and check the contents against its packing list.
2. If the HP Server is already installed and operating, shut down the NOS according to directions in your NOS documentation.
3. Press the power switch on the HP Server's control panel when prompted by the operating system. Normally, this completes the shutdown procedure.

WARNING	Power supplies will continue to provide standby current to the HP Server until the power cables are disconnected.

4. Disconnect the AC power cords.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

5. Pull the chassis out of the rack.
6. Remove the Processor/Memory Complex.

   Refer to Chapter 5, "Removing the Processor/Memory Complex."
7. Ensure the processor speed of the second processor (CPU 2) is the same as the existing processor before installing the second processor.
8. Make sure that the metal ejector pin in the processor socket is flush in the socket.
9. Position the microprocessor inside the four posts on the Processor Baseboard, pins toward the rear and over the processor socket. Gently press the processor into position.

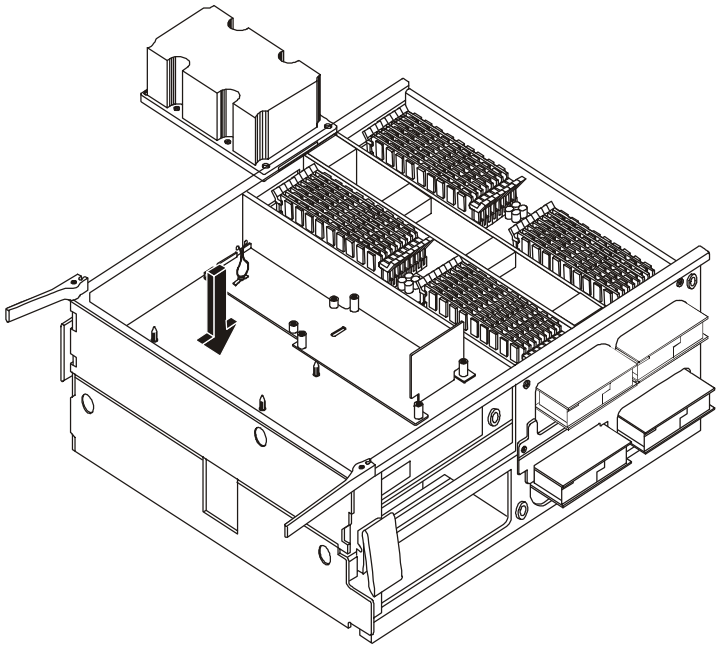


Figure 6-2. Installing the Microprocessor

10. Place the power pod into position on the Processor Baseboard. Ensure that the engaging tab is to the rear of the retention module (RM) and then slide it forward to engage its connector on the processor.

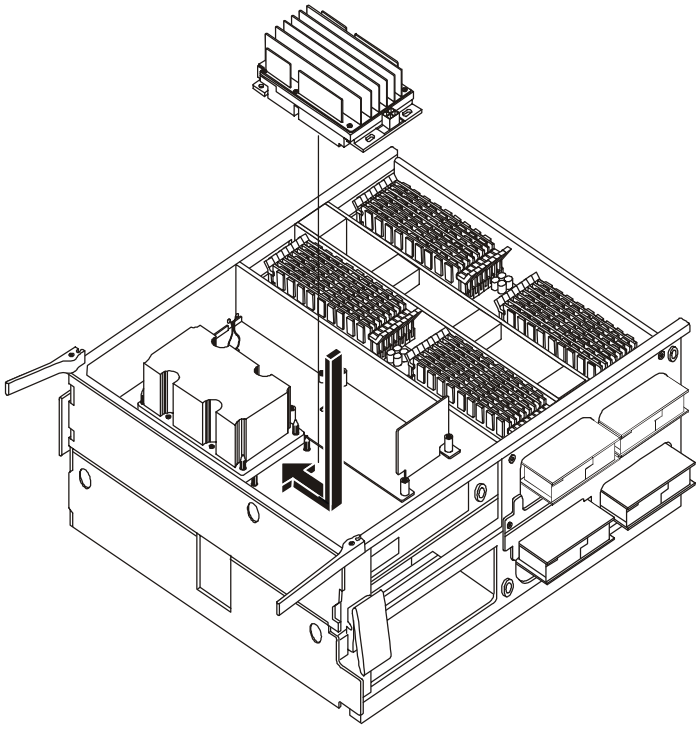


Figure 6-3. Connecting the Power Pod

11. Place the triple beam into position by lowering it down over the processors/power pod or the CPU thermal dummy.
12. Connect the Y-cable to each power pod.

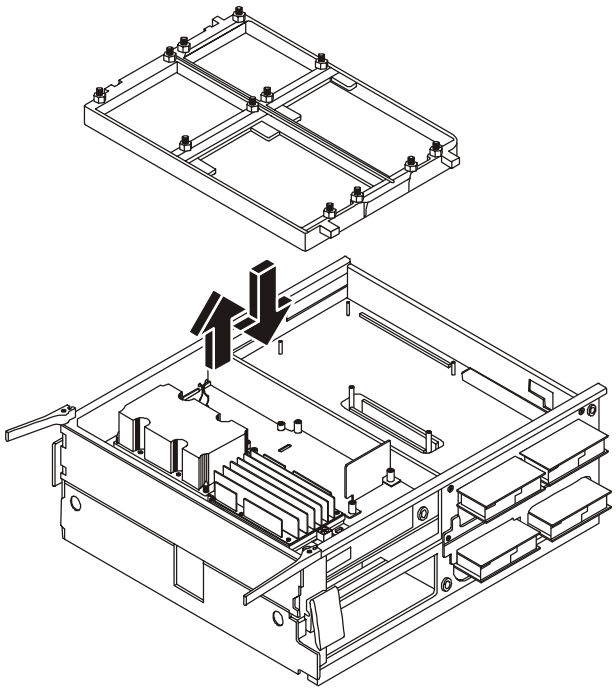


Figure 6-4. Placing the Triple Beam Over the Processors

13. Secure the triple beam into place by tightening the top captive screws and then the four thumbscrews on the end of the beam.
14. Insert the sheet metal baffle at the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To insert the baffle, press the flexible retaining tabs in as you slide the baffle into place.
15. Be sure to close the plastic latch to secure the Processor/Memory Complex halves.
16. Insert the Processor/Memory Complex into the chassis as described in "Installing the Processor/Memory Complex" in Chapter 5.

Removing a Processor

Use this procedure to remove a processor and its heatsink. The heatsink is attached to the back of the processor. If a processor is not replaced, a CPU thermal dummy must fill the slot to ensure proper cooling of the unit.

CAUTION	Always wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist strap contacts your skin. Before you touch the processor to remove it, touch a grounded unpainted metal surface on the HP Server to discharge static electricity.

To remove an existing processor, complete the following procedure:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Processor/Memory Complex as described in "Removing the Processor/Memory Complex" in Chapter 5.
3. Orient the complex such that you have access to the surface from which you are removing processors.
4. Remove the sheet metal baffle located at the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To remove the baffle, press the flexible retaining tabs in as you slide the baffle out. You need this sheet metal baffle out of the way to access some of the captive screws in the next step.
5. Loosen the four thumbscrews that secure the triple-beam to the sides of the Processor/Memory Complex.
6. Loosen the captive screws in the top of the triple-beam and lift the triple beam up and away from the Processor/Memory Complex.
7. Remove the Y cable to the power pods.
8. Remove the power pod associated with the processor by sliding it away from the processor. This will disengage the power pod from the processor connector.
9. Press the black extraction lever next to the processor cartridge to eject the processor cartridge from its socket.
10. Lift the processor cartridge from its socket and remove it from the system.
11. Place the cartridge on a clean ESD-protective surface.

Installing a CPU Thermal Dummy

CPU thermal dummies must be installed where a processor is absent to properly direct cooling airflow. Complete the following procedure to install a CPU thermal dummy:

Observe the safety and ESD precautions at the beginning of this chapter.

If you are installing a CPU thermal dummy, position the blank into place over the four posts on the Processor Baseboard.

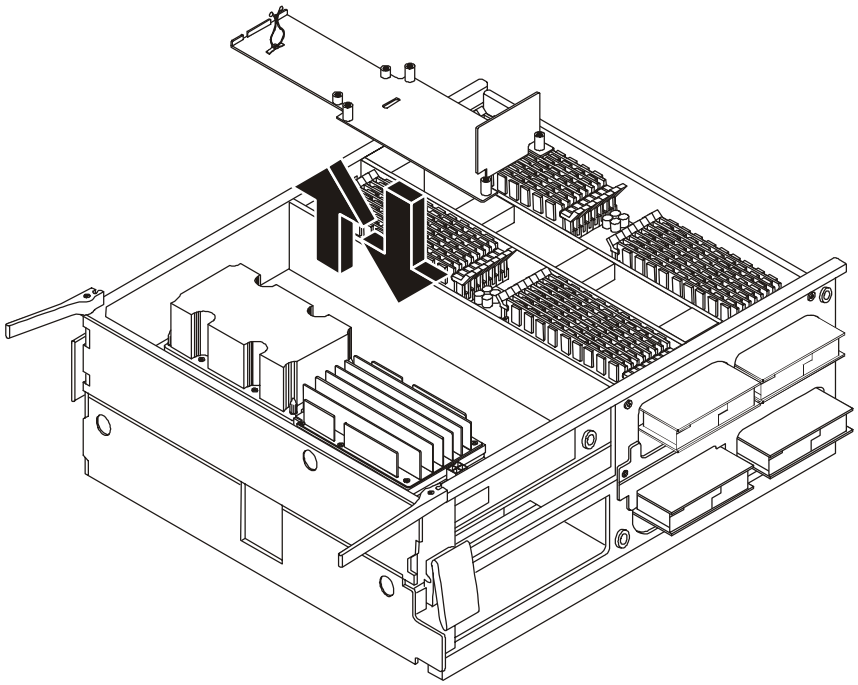


Figure 6-5. Inserting a CPU Thermal Dummy

2. Secure the triple beam into place by tightening the captive screws on top of the beam and then the four thumbscrews on the end of the beam.
3. Insert the sheet metal baffle located at the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To insert the baffle, press the flexible retaining tabs in as you slide the baffle into place
4. Insert the Processor/Memory Complex into the chassis as described in Chapter 5, "Installing the Processor/Memory Complex."

Installing the Processor Baseboard

The Processor Baseboard resides between the two halves of the Processor/Memory Complex. Removal of the Processor Baseboard involves disassembly of the entire Processor/Memory Complex.

The board can accommodate one to four processors and two memory boards. If your server does not have three or four processors, the underside of the Processor Baseboard will have CPU thermal dummies in place of the processors and power pods. These assemblies are easily removed when you lift the triple beam off the board.

Removing the Processor Baseboard

To remove the processor baseboard, complete the following procedure.

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Processor/Memory Complex from the system as described in "Removing the Processor/Memory Complex" in Chapter 5.
3. Remove the topside memory board from the Processor/Memory Complex as described in "Removing and Installing Memory Boards" in Chapter 5.

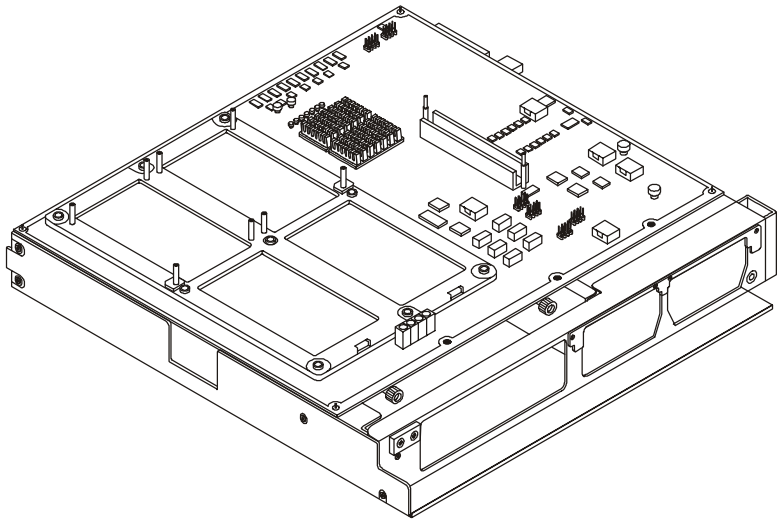


Figure 6-6. The Processor Baseboard

4. Remove the topside microprocessors as described in "Removing a Microprocessor" in Chapter 6.
5. Carefully turn the Processor/Memory Complex over so that you can work on its underside.
6. Repeat steps three and four to remove components and hardware from this side of the Processor Baseboard.
7. With all components and hardware removed from both sides of the Processor/Memory Complex, carefully turn it over again so that it is oriented with its face up.
8. Loosen the two captive screws securing the Processor Baseboard between the two halves of the Processor/Memory Complex.
9. Open the four plastic latches that secure the two halves of the Processor/Memory Complex together. Gently lift the top half up and remove it.
10. Remove the Processor Baseboard from the Processor/Memory Complex.

NOTE	Remember the guide pin position in relation to the Processor Baseboard for re-installation. Use the location of the VHDM connector to identify the topside of the processor baseboard versus the bottom side of the processor baseboard.

Installing the Board in a System with Three or Four Microprocessors

When installing a board that contains three or four microprocessors, complete the following procedure:

1. Place the bottom half of the Processor/Memory Complex on a clean ESD-protected work surface. The bottom half of the complex has wider rails as compared to the top half. Be sure that the rail side of the complex is in contact with the work surface.
2. Carefully place the Processor Baseboard topside up into position on the bottom half of the Processor/Memory Complex. Be sure that the guide pins align with the holes on the Processor Baseboard. If placed correctly, the Acacia Tree silkscreen will be visible.

NOTE The Processor Board must be squarely aligned in the Processor/Memory Complex.

3. Place the top half of the Processor/Memory Complex over the Processor Baseboard. Be sure that the guide pin relations are correct. The Processor Baseboard should be between the two Processor/Memory Complex halves.
4. Snap shut the four plastic latches that secure the two halves of the Processor/Memory Complex together.
5. Tighten the two captive screws that help secure the Processor Baseboard to the Processor/Memory Complex.
6. Carefully turn the Processor/Memory Complex over so that you can work on the underside.
7. Locate and place the triple beam into position. (Do not install microprocessors or power pods).

NOTE Securing the triple beam into position without the microprocessors and power pods reduces the possibility of stress occurring on the Processor Baseboard when you install microprocessors and the memory board on the topside.

Secure the triple beam by tightening the four thumbscrews on the ends of the beam. Do not tighten the captive screws on the top of the triple beam at this time.

9. Carefully turn the Processor/Memory Complex over so that you can work on the topside.
10. Install the processors and power pods into the top half of the Processor/Memory Complex as described in “Installing an Additional Processor” in Chapter 6.
11. Install the triple beam.
12. Insert the sheet metal baffle located to the front of the processors or CPU thermal dummies in the Processor/Memory Complex. To insert the baffle, press the flexible retaining tabs in as you slide the baffle into position.
13. Install the memory board into the top half of the Processor/Memory Complex as described in “Removing and Installing Memory Boards” in Chapter 5.
14. Carefully turn the Processor/Memory Complex over so that you can work on the underside.
15. Remove the triple beam by first loosening the four thumbscrews found on the ends and then the captive screws found on the top of the triple beam. Lift the triple beam off the complex.

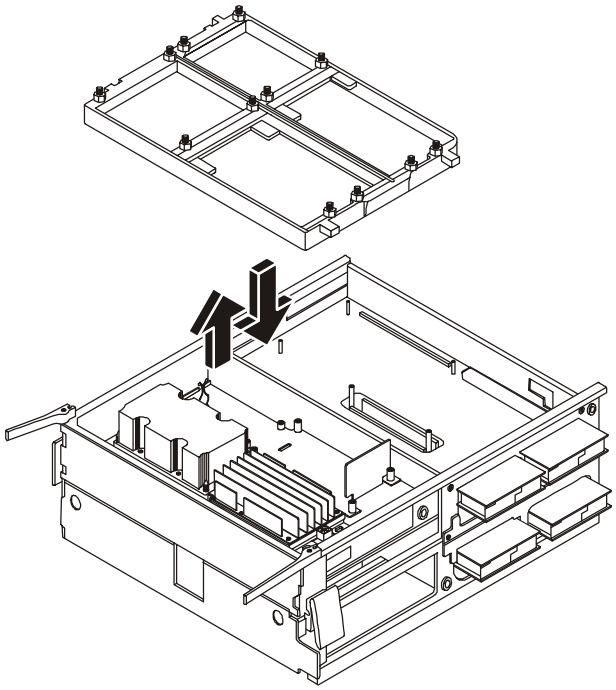


Figure 6-7. The Triple Beam

16. Install the processors and power pods into the bottom half of the Processor/Memory Complex as described in "Installing an Additional Processor" in Chapter 6.
17. Install the triple beam and the metal baffle.
18. Install the memory board into the bottom half of the Processor/Memory Complex as described in "Removing and Installing Memory Boards" in Chapter 5.
19. Install the Processor/Memory Complex into the server as described in "Installing the Processor/Memory Complex" in Chapter 5.

Installing the Board in a System with Two Microprocessors

When installing a board with two microprocessors, complete the following procedure:

1. Place the bottom half of the Processor/Memory Complex on a clean ESD-protected work surface. The bottom half has wider rails as compared to the top half. Be sure that the rail side of the complex is in contact with the work surface.
2. Carefully place the Processor Baseboard topside up into position on the bottom half of the Processor/Memory Complex.
3. Place the top half of the Processor/Memory Complex over the Processor Baseboard. Be sure that the guide pin relations are correct. The Processor Baseboard should be between the two Processor/Memory Complex halves.
4. Snap shut the four plastic latches that secure the two halves of the Processor/Memory Complex together.
5. Tighten the two captive screws that help secure the Processor Baseboard to the Processor/Memory Complex.
6. Carefully turn the Processor/Memory Complex over so that you can work on the underside.

7. Install the CPU thermal dummies into the bottom half of the Processor/Memory Complex as described in “Installing a CPU Thermal Dummy” in Chapter 6.
8. Install the memory board into the bottom half of the Processor/Memory Complex as described in “Removing and Installing Memory Boards” in Chapter 5.
9. Install the triple beam and metal baffle.
10. Carefully turn the Processor/Memory Complex over so that you can work on the topside.
11. Install the processors and power pods into the top half of the Processor/Memory Complex as described in “Installing an Additional Processor” in Chapter 6.
12. Install the triple beam and metal baffle.
13. Install the memory board into the top half of the Processor/Memory Complex as described in “Removing and Installing Memory Boards” in Chapter 5.
14. Install the Processor/Memory Complex into the server as described in “Installing the Processor/Memory Complex” in Chapter 5.

7 Installing Accessory Boards

Introduction

The HP Server has ten I/O expansion slots available. PCI slots P1-P2 are 64-bit/33 MHz non-Hot Plug I/O expansion slots. PCI slots P3-P10 are 64-bit/66 MHz PCI Hot Plug I/O expansion slots . The PCI expansion slots are contained in four PCI segments:

- F16, 0 provides for PCI slots 1 and 2, video, and the PXB that controls the Super I/O functions.
- F16, 1 provides for PCI slots 3 through 5 and the dual-channel LVDS controller.
- F16, 2 provides for slots 6 through 8.
- F16, 3 provides for slots 9 and 10.

Tested PCI Boards

For a list of tested PCI boards, check for compatibility in the Hardware Tested Products list for the HP Server under the Service and Support topic for the specific NOS used in the HP Server at HP's web site:

http://www.hp.com/

CAUTION	Some accessory board outputs may exceed U.S. National Electrical code (NFPA 70) Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the National Electrical Code. (All Hewlett-Packard boards comply with Class 2.)

Also refer to the Readme file and Chapter 10, "Configuring the HP Server," for instructions.

Tools Required

The tools used to remove or add accessory boards in the HP Server include:

- Phillips screwdriver (cross-head with #2 bit)
- Jumper removal tool or needle-nosed pliers
- An anti-static service kit (3M 8501/8502/8503 or equivalent). This kit includes a static-dissipating work surface, a chassis clip lead, and a wrist strap.
- Equipment log and pencil.

Accessory Board Installation Guidelines

The following sections provide the guidelines necessary to install the PCI accessory boards into the HP Server.

IRQ Settings

The IRQ settings are automatically assigned and don't require user intervention. The HP Server uses the Plug-and-Play feature of the PCI boards to correctly assign its resources automatically.

Boot Priority

The Server's boot priority (BIOS search order for a boot drive) should be considered when selecting a PCI slot on the system board. This is especially important if you are installing a board that requires an early number in the boot order. The board's boot priority is set by its slot location in the boot order. See Figure 7-3.

The embedded SCSI controller consists of two channels, A and B. Channel A is typically used to control the internal SCSI drives. Channel B is typically used to control the external SCSI devices or used with Channel A to create disk duplexing. On each SCSI channel, the HP Server scans for a boot device starting at device ID 0 and works up from there.

By default the HP Server searches for boot devices in this order:

1. SCSI
2. PM
3. SM
4. PS
5. Other Boot Devices

   IDE DVD drive

   Flexible disk drive
6. PCI slot 1
7. PCI slot 2
8. PCI slot 3
9. PCI slot 4
10. PCI slot 5
11. PCI slot 6
12. PCI slot 7
13. PCI slot 8
14. PCI slot 9
15. PCI slot 10

Installing Accessory Boards

The HP Server has eight hot swap PCI board slots and two non-hot swap PCI board slots. Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emission characteristics of the server and to ensure proper cooling of the system. The following procedures detail the steps required to install both types of boards.

Installing a Hot Swap PCI Board

The HP Server has eight hot plug PCI I/O slots in the I/O Baseboard. You can replace a hot plug PCI I/O board without shutting down the server. However, you must use the operating system or a resident GUI to shut down or power off the PCI I/O board before you replace it.

The PCI hot-plug (PHP) is a rotating plastic mechanism that actuates a switch located on the PCI hot plug LED board. Each PCI slot has four indicator LEDs: two on the outside and two on the inside of

the system. The LEDs operate differently depending upon the operating system installed. Please refer to your operating system's manual.

To install a hot swap hot plug PCI I/O board, complete the following steps:

1. If your server is operating, use your operating system or GUI application to make sure the PCI slot that you are installing the board into is powered down.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

2. Pull the chassis out of the rack as far as it will go.
3. Loosen the two thumbscrews in the back of the chassis that secure the rear part of the top cover.
4. Lift the rear cover to expose the hot plug PCI slots.

CAUTION	Do not touch the components or gold edge connectors on the add-in board as this may damage the connectors causing erratic performance.

5. Remove the card from its protective wrapper, and place it component-side up on a nonconductive, antistatic surface.
6. Record in your log the serial number of the board and any jumpers or switch settings according to the board manufacturer's instructions. See Appendix B for the equipment log form.
7. Skip to step 8 if you are installing a board in an empty slot. To replace a board or install a different board in an occupied slot, after the LED shows which slot is powered down, press the center of the PHP mechanism to disengage it from the LED board.
8. Be sure that the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis is open so that it will allow a board to be removed/inserted.

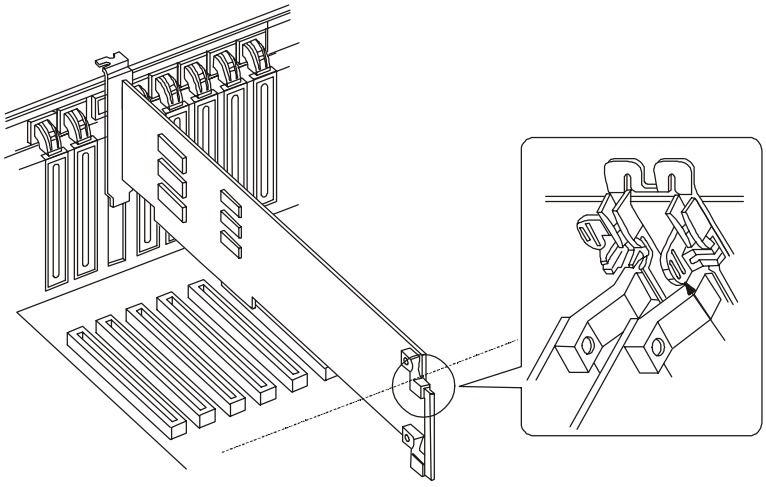


Figure 7-1. Open the Plastic Retaining Mechanism Towards the Front of the Server

9. Be sure that the plastic PCI hot plug (PHP) mechanism that secures the end of the board nearest the rear of the chassis is in the open position. If not, press the center of the PHP until it clicks open and then rotate the mechanism downward from outside the chassis.

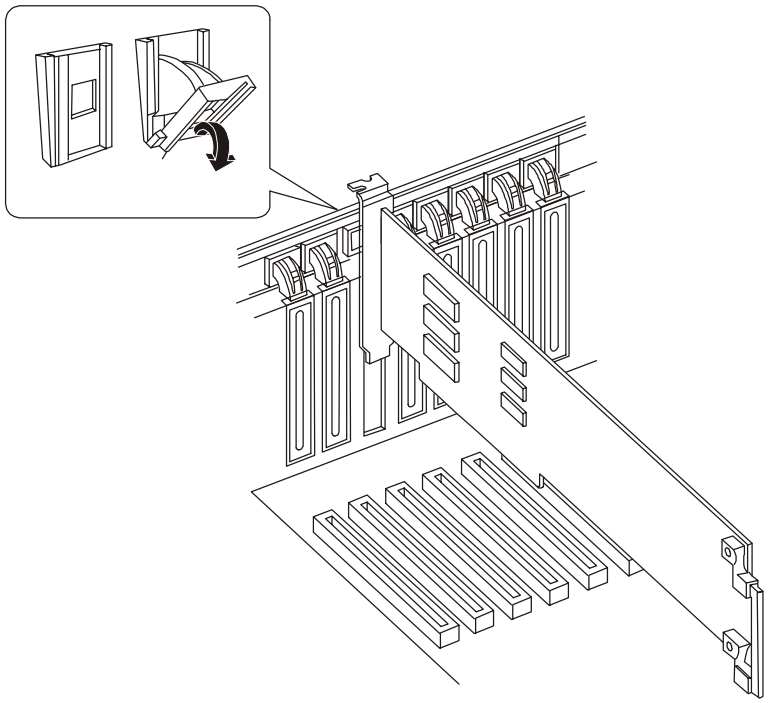


Figure 7-2. Open the PCI PHP Mechanism Securing the Board at the Rear of the Chassis

10. If you are adding a new board, remove the perforated rear panel cover in the slot you're using by pushing it out from inside the chassis.
11. Press the PCI board down firmly until it seats in its slot.

CAUTION	Some accessory/option board outputs exceed Class 2 or limited power source limits and must use appropriate interconnecting cabling in accordance with the national electric code during installation.

12. Close the plastic latching mechanism that secures the end of the board nearest the front of the chassis.
13. Rotate the PHP mechanism near the rear of the chassis up until it clicks into place. This position both secures the end of the board and allows it to be activated with the operating system or GUI application.
14. Close the rear part of the top cover and tighten the two thumbscrews.
15. Connect any required cabling to the add-in board.
16. If your server is operating, use the operating system or GUI application to power up the PCI I/O slot into which you installed the PCI I/O board.
17. Push the system back into the equipment rack.

Installing a Non-Hot Plug PCI Board

Use this procedure to install a non-hot plug PCI accessory board. Observe the safety guidelines listed earlier. The server must be shut down before installing a non-hot plug PCI board.

1. If the HP Server is already installed and working, power down the HP Server.

Refer to Chapter 1, "Controls, Ports, and Indicators."

WARNING	The power supply will continue to provide standby current to the HP Server until the power cable is disconnected.

2. Disconnect the power cables and any external cables connected to the HP Server. If necessary, label each one to expedite re-assembly.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

3. Pull the chassis out of the rack.

CAUTION	Wear a wrist-strap and use a static-dissipating work surface connected to the chassis when handling components. Ensure the metal of the wrist-strap contacts your skin.

4. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.

   Refer to Chapter 2, "Opening and Closing the HP Server."

5. Read the documentation included with the accessory board and follow any special instructions.
6. Identify the accessory slot number to be used. See Figure 7-3.

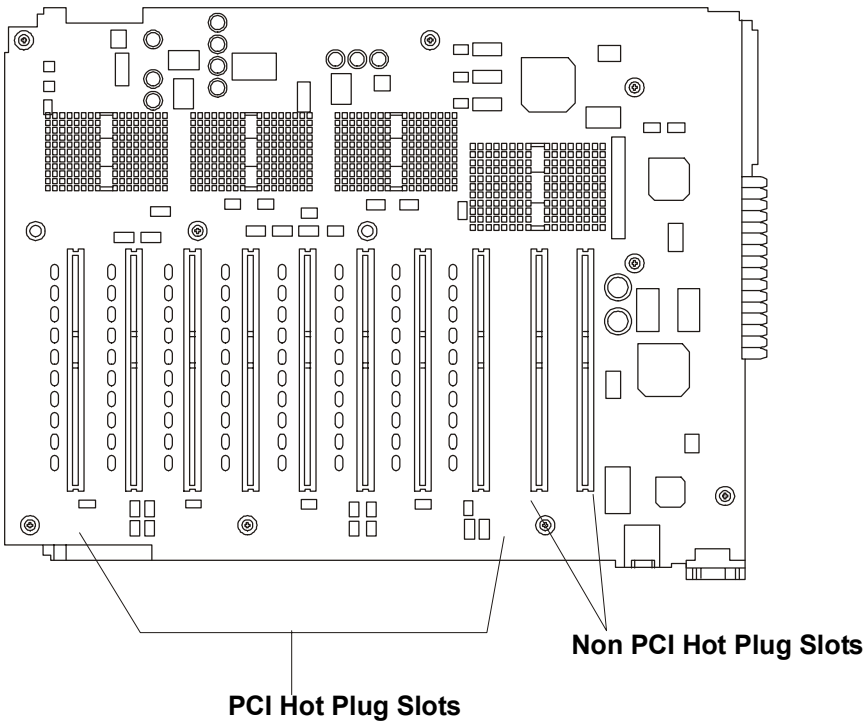


Figure 7-3. Accessory Slots

NOTE	Refer to the Readme file for the Tested Products List that shows specific slot recommendations for a particular PCI board type.

7. Lift the rear cover to expose the non-hot plug PCI adapter board cover.
8. Loosen the screw that secures the non-hot plug PCI adapter board cover.
9. Grasp the cover by its exposed, long side and lift the cover over the non-hot plug boards away from the chassis. You can completely remove the cover if you want by unseating the slot hinge. Access is now available to the two non-hot plug PCI slots and the Legacy I/O board.

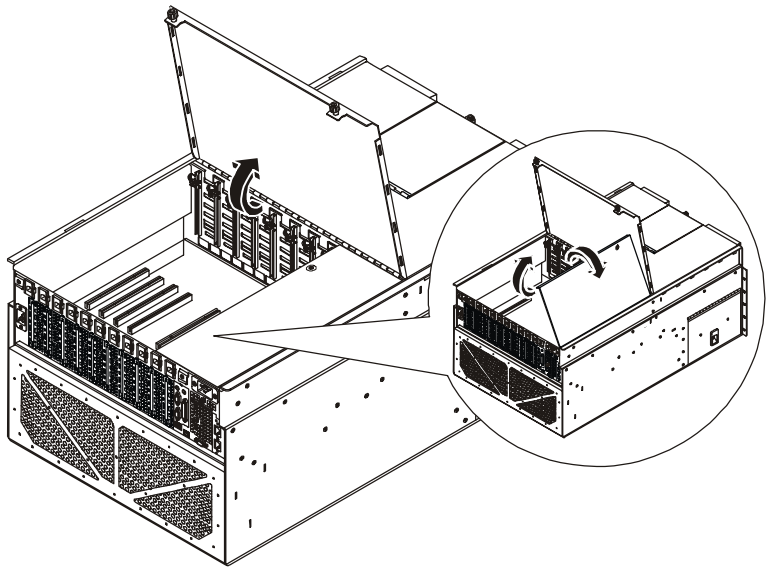


Figure 7-4. Accessing the Non-Hot Plug Boards

10. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis so that it will allow a board to be inserted
11. Be sure that the rocker switch that secures the end of the board nearest the rear of the chassis is in the open position. If not, press the center of the rocker switch until it clicks open and then rotate the mechanism downward from outside the chassis.
12. If you are adding a new board, remove the perforated rear panel cover in the slot you're using by pushing it out from inside the chassis.

NOTE	Ensure you save the slot covers for use later to prevent EMI interference. These slot covers make a better metal-to-metal contact than previous slot cover designs.

13. Being careful not to touch the components or gold edge connectors on the add-in board, remove it from its protective wrapper and place it component-side up on a nonconductive, antistatic surface.
14. Record the serial number of the board in your equipment log. See Appendix B for the equipment log.
15. Press the PCI adapter board down firmly until it seats in its slot.
16. Close the plastic latching mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.
17. Rotate the rocker switch near the rear of the chassis up until it clicks into place.
18. Install the non-hot plug PCI adapter board cover by aligning the slotted hinge into the chassis housing, closing the cover, and securing the cover screw.

19. Attach any cables to the PCI adapter board you just installed.
20. Close the rear part of the top cover and tighten the two thumbscrews.
21. Attach the power cords.
22. Push the system back into place into the equipment rack.
23. Power on any attached peripheral devices.
24. Power on the system.
25. Once the accessory board is installed, you may need to install software drivers. The drivers for the new board are either part of your existing system software or included on a flexible diskette provided with the accessory board.

Removing Accessory Boards

The HP Server has eight hot swap PCI board slots and two non-hot swap PCI board slots. You can remove a hot plug PCI I/O board without shutting down the server, but you must use the operating system or a resident GUI to shut down or power off the PCI I/O board before removing it. The HP Server must be shut down before installing a non-hot plug PCI board.

CAUTION	Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emission characteristics of the server and to ensure proper cooling of the system.

Removing a Non-Hot Plug PCI Board

To remove a non-hot plug PCI board, complete the following steps:

1. Observe the safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Remove both AC power cords. Removing the power cords ensures that the server is not under standby power.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

4. Pull the chassis out of the rack as far as it will go.
5. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
6. Lift the rear cover to expose the non-hot plug PCI adapter board cover.
7. Loosen the screw that secures the non-hot plug PCI adapter board cover.
8. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover by unseating the slot hinge. Access is now available to the two non-hot plug PCI slots and the Legacy I/O board.
9. Label and disconnect all peripheral cables attached to the board you are going to remove.
10. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.

11. Press the center of the rocker switch that secures the end of the board nearest the rear of the chassis. When the mechanism clicks open, rotate it all the way down from the outside of the chassis.
12. Carefully grasp the adapter board and gently slide it up and out of the system. Be sure not to allow the board's components to touch any neighboring boards as you lift the board out of the system.
13. Place the board component side up on a nonconductive, antistatic surface.

Removing a Hot Plug PCI Board

To remove a hot plug PCI board, complete the following steps:

1. Observe standard safety precautions when working with the server.
2. If your server is operating, use your operating system or GUI application to power down the PCI slot that contains the board you are going to remove.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

3. Pull the chassis out of the equipment rack as far as it will go.
4. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
5. Lift the rear cover to expose the hot plug PCI slots.
6. Disconnect any cables attached to the board you are removing.
7. Press the center of the rocker switch that secures the end of the board nearest the rear of the chassis. When the mechanism clicks open, position it all the way down by rotating it from the outside of the chassis.
8. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.
9. Carefully grasp the adapter board and gently slide it up and out of the system. Make sure that you do not scrape the board against other components.
10. Store the board in an antistatic protective wrapper.
11. Install an expansion slot over the vacant slot by aligning the cover with the slot from the rear of the chassis and pressing the cover into the slot.
12. Close the rear part of the chassis top cover and tighten the two thumbscrews.
13. Push the system back into the cabinet rack.

8 Server Management Boards

Introduction

The server management features are implemented using three microcontrollers: the Baseboard Management Controller (BMC), the Intelligent Chassis Management Bus Controller (ICMB) controller on the Legacy I/O board, and the Hot-Swap Controller (HSC) on the Power Distribution Board (T-Docking). The firmware of the three microcontrollers is field upgradeable using the Firmware Update utility.

This chapter describes the boards that are utilized by these microcontrollers to provide server management functions and status:

- I/O Baseboard
- Sideplane Board
- PCI Hot Plug LED Board
- Legacy I/O Board
- Power Distribution Board (T-Docking)

Baseboard Management Controller (BMC)

The Baseboard Management Controller (BMC) is a microcontroller with associated circuitry that resides on the Legacy I/O board. The primary purpose of the BMC is to autonomously monitor for system platform management events, and log their occurrence in the non-volatile System Event Log (SEL). System platform management events include over-temperature and over-voltage conditions as well as fan failures.

The following is a list of the major functions of the BMC:

- Access to the monitored information so system management software can poll and retrieve the present status of the platform.
- Functions for the front-side system controls and indicators. These functions include control of system power, hard-resets, Power LED displays, cooling fault detection, general fault detection, and power fault LED displays. The BMC provides this control both when the system is powered down and is functioning on standby power only, and when the system is powered up.
- Access to the non-volatile Sensor Data Record (SDR) Repository. Sensor Data Records provide information that the system management software uses to automatically configure itself for the number and type of Intelligent Platform Management Interface (IPMI) sensors in the system (e.g. temperature and voltage sensors).
- System Power Control
- Platform Event Paging (PEP) / Platform Event Filtering (PEF)
- Power Distribution Board monitoring
- Temperature and Voltage monitoring
- Fan failure monitoring

- Processor presence monitoring
- Speaker 'Beep' capability on standby and when system is powered up
- Itanium processor SEEPROM interface
- Processor temperature monitoring
- Hot plug PCI slot status monitoring
- Processor bus speed setting
- Chassis fan failure light control
- Chassis power fault light control
- Chassis power light control
- SDR/SEL timestamp clock
- Boardset FRU information interface
- Fault Resilient Booting (FRB)
- System management watchdog timer
- Front panel diagnostic interrupt handling (also called the Init Switch)
- Diagnostics interrupt (Init status monitor)
- Event receiver
- System interface to the IPMB
- Secure mode control, including video blank option monitoring and control and front panel lock/unlock initiation.
- IPMI Management Controller Initialization Agent
- Magic Packet and Wake on LAN / Power on LAN support
- Emergency Management Port (EMP) interface

Intelligent Chassis Management Bus (ICMB) Controller

The ICMB Controller resides on the Legacy I/O Board. It serves as a bridge between the internal Intelligent Platform Management Bus (IPMB) and the external Intelligent Chassis Management Bus (ICMB). The internal IPMB transports server management information within a system, and the external ICMB transports server management information between various chassis in a server(s) and peripherals cluster configuration.

Hot Swap Controller (HSC)

The Hot Swap Controller (HSC) resides on the Power Distribution Board (T-Docking). The primary functions of the HSC are as follows:

- Implements the SAF-TE command set
- Controls the fault lights

- Provides a path for management information via SCSI
- Retrieves drive fault status, Backplane temperature, and fan failure information via IPMB
- Queries the status of the power distribution board by retrieving information from the BMC via the IPMB
- Controls drive power-on and power-down, facilitating hot-swapping.

I/O Baseboard

The I/O Baseboard resides in the upper rear of the chassis and plugs into the Sideplane. After removing all the PCI I/O boards, you can remove the I/O Baseboard.

Removing the I/O Baseboard

To remove the I/O baseboard, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.

WARNING	The power supply will continue to provide standby current to the HP Server until the power cable is disconnected from the rear panel.

2. Power down the HP Server.
3. Disconnect the power cables.
4. Open the rear cover of the server and remove the non-hot plug PCI adapter board cover by loosening its screw and unhinging the cover.
5. Remove the top cover as described in "Removing the Top Cover" in Chapter 2.
6. Remove the Legacy I/O board as described in "Removing the Legacy I/O Board" in Chapter 8.
7. Disconnect the cable to the external SCSI port from the I/O Baseboard.

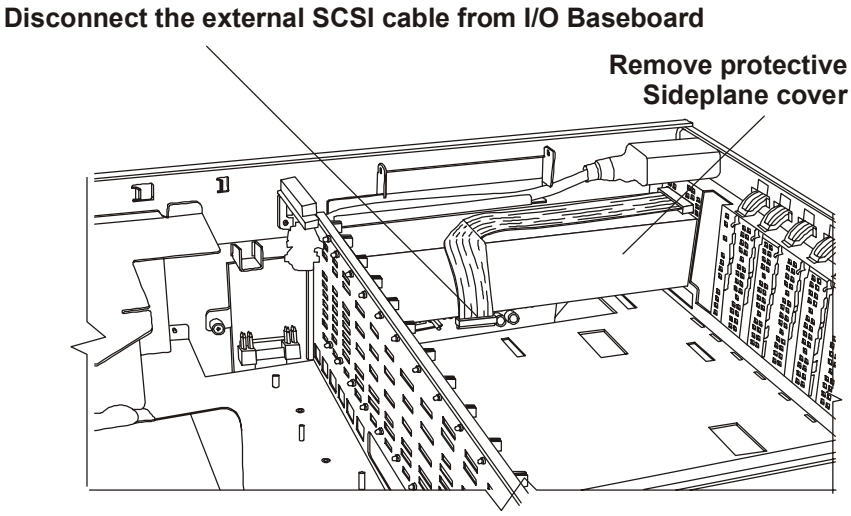


Figure 8-1. Removing the SCSI Cable from the I/O Baseboard

8. Loosen the captive screw to disconnect and remove the external SCSI port from the chassis I/O connector at the rear of chassis.
9. Remove all non-hot plug PCI and hot plug PCI I/O adapter boards as described in "Removing Accessory Boards" in Chapter 7.
10. Remove all PCI slot plastic dividers.
11. Loosen the thumbscrew at the back of the chassis holding the protective cover over the DC-DC converters on the Sideplane, and remove the cover.

12. Remove all DC-DC converters from the Sideplane.

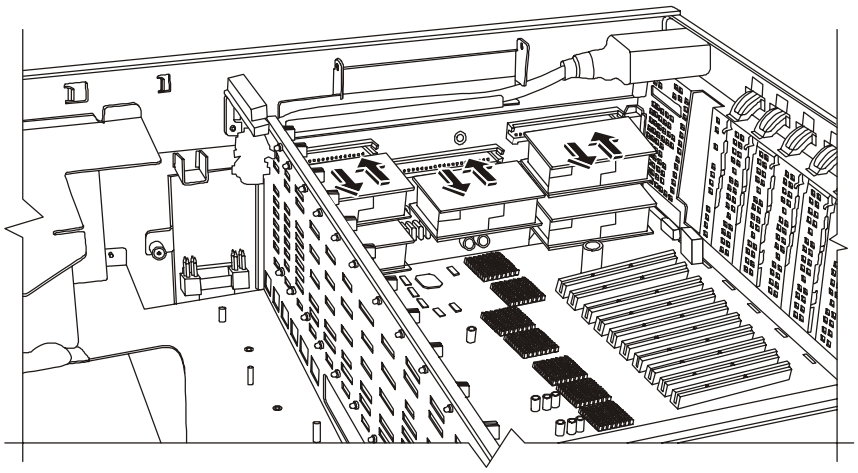


Figure 8-2. Removing the Sideplane DC-DC Converters

13. Loosen the two captive screws that hold the plastic shield over the I/O Baseboard. These screws also secure the baseboard tray to the server chassis.
14. Remove the PCI LED cable.
15. Remove the plastic shield.
16. Remove the Internal SCSI cable for the hard drives from the board.
17. Use the two extraction/installation levers on the sides of the I/O Baseboard to pull it clear of the connector on the Sideplane.
18. Once loose, slide the I/O Baseboard in the direction of the levers against the chassis frame.

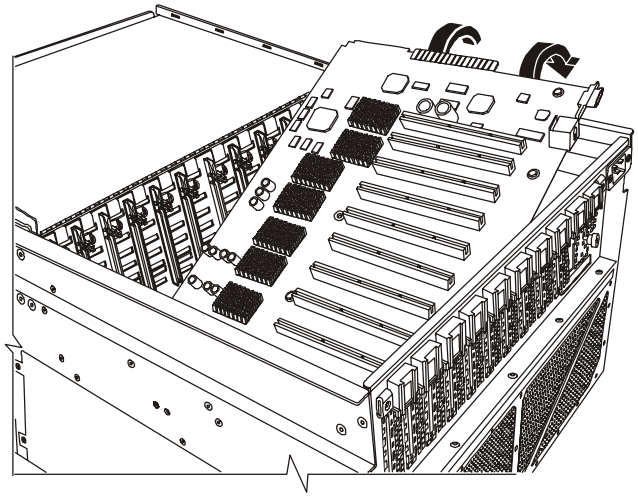


Figure 8-3. I/O Baseboard Removal

19. Lift the connector end out of the chassis first followed by the rest of the I/O Baseboard.
20. Place on a clean ESD-protected work surface.

21. Remove the nine screws and the two hex jackscrews that secure the video connector to the I/O Baseboard in order to separate it from the I/O Baseboard tray.

Installing the I/O Baseboard

To install the I/O Baseboard, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Install the I/O Baseboard into the I/O Baseboard tray.
3. Orient the I/O Baseboard and tray assembly such that the connector end faces the Sideplane.
4. Angle the I/O Baseboard such that the side with the two extraction/installation levers lowers into the chassis first.
5. Slide the lever end of the I/O Baseboard against chassis frame then lower the connector end into the chassis.
6. Slide the I/O Baseboard towards the Sideplane until lever aligns with the locking slots.
7. Rotate the levers downward to press the I/O Baseboard securely into the Sideplane.
8. Connect the Internal SCSI cable to the front of the I/O Baseboard.
9 Install the plastic shield over the I/O Baseboard and tighten the two thumbscrews that secure the shield and the I/O Baseboard in the chassis.
10. Connect the PCI LED cable.
11. Install the DC-DC converters on the Sideplane. The voltages are marked on the power supplies and near the sockets on the baseboard.
12. Install the protective cover over the DC-to-DC converters on the Sideplane, and secure the cover with the thumbscrew.
13. Connect the cable to the external SCSI port at both ends: one to the I/O Baseboard and the other secured to the rear of the chassis with the captive thumbscrew.
14. Install the Legacy I/O board and cables as described in “Installing the Legacy I/O Board”.
15. Install the non-hot plug PCI and hot plug PCI adapter boards as described in “Installing Accessory Boards” in Chapter 7.
16. Install all PCI slot plastic dividers (I/O Card Dividers) as required.
17. Install the top cover as described in “Replacing the Top Cover” in Chapter 2.
18. Attach the non-hot plug PCI adapter board cover and secure it with its screw.
19. Close the PCI I/O access door, and secure it with the two captive thumbscrews.
20. Reconnect the power cables.

Sideplane Board

The Sideplane is attached inside the left wall at the rear of the chassis. It receives the I/O Baseboard as well as the Power Distribution Board (T-Docking). To remove the Sideplane you must remove the Power Distribution Board (T-Docking), the I/O Baseboard, and the Processor/Memory Complex.

Removing the Sideplane Board

To remove the Sideplane board, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Remove the I/O Baseboard as described in "Removing the I/O Baseboard" in this chapter.
3. Remove the Power Distribution Board (T-Docking) as described in "Removing the Power Distribution Board (T-Docking)" in this chapter.
4. Remove the Processor/Memory Complex as described in "Removing the Processor/Memory Complex" in Chapter 5.
   a) Remove the sheet-metal cover protecting the D2D converts on the sideplane board.
   b) Remove the D2D converters from the sideplane board.

NOTE Do not remove the screws that hold the Sideplane to the mounting plate.

5. Loosen the captive thumbscrews on the Sideplane that secure it and its mounting plate to the chassis.

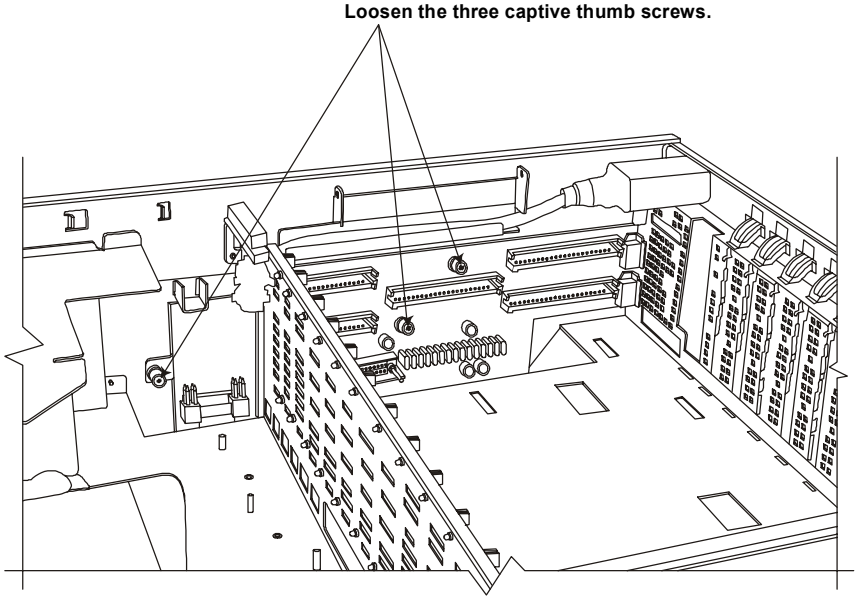


Figure 8-4. Removing the Screws from the Sideplane

6. Slide the Sideplane towards the front of the chassis. As you slide the board, keep the front bottom edge of the board in contact with the carrier tray as the board is rotated up and out of the chassis.

7. Tilt the Sideplane up and out of the chassis.
8. Remove the two retaining screws from the Sideplane to remove the mounting plate.

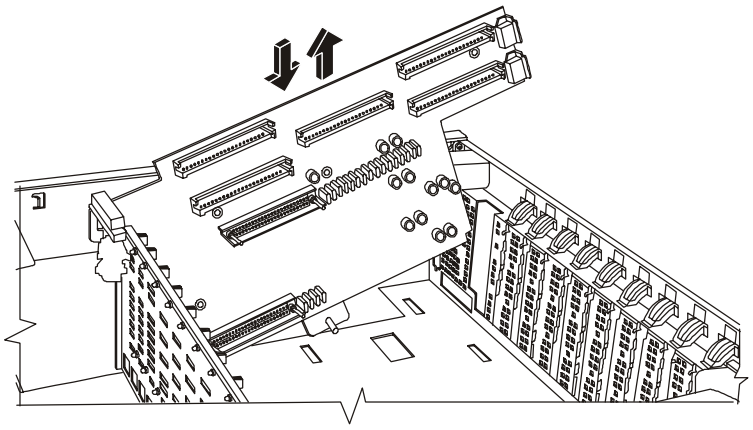


Figure 8-5. Remove the Sideplane

Installing the Sideplane Board

To install the Sideplane board, complete the following steps:

1. Observe all safety and ESD precautions for handling electronic components.
2. Install the Sideplane on to the mounting plate by tightening the two mounting plate screws.
3. Lower the board into the side of the chassis, and slide it toward the rear of the chassis back into position. The front lower corner of the board is the rotation point you should use when positioning the board into place.
4. Tighten the captive thumbscrews on Sideplane to secure it to the chassis.
5. Reinstall the Power Distribution Board (T-Docking) as described in "Installing the Power Distribution Board (T-Docking)".
6. Reinstall the I/O Baseboard as described in "Installing the I/O Baseboard".
7. Reinstall the Processor/Memory Complex as described in "Installing the Processor/Memory Complex" in Chapter 5.

PCI Hot Plug LED Board

The PCI Hot Plug LED Board resides just on the inside of the top rear of the chassis. This board enables PCI hot plug boards to be plugged into and out of the system without it being shut down.

Removing the PCI Hot Plug LED Board

To remove the PCI Hot Plug LED Board, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Removing the power cords ensures that the server is not under standby power.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

4. Pull the chassis out of the rack as far as it will go.
5. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
6. Lift the rear cover to expose the non-hot plug PCI adapter board cover.
7. Loosen the screw that secures the non-hot plug PCI adapter board cover.
8. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover if you want by unseating the slot hinge. Access is now available to the PCI Hot Plug LED Board.
9. Disconnect the cable attached to the PCI Hot Plug LED Board.
10. Locate and remove the four small, black plastic retaining pins on the board. The pins are evenly spaced across the length of the board. To unlock the pin, grasp the head of the pin from the inside and pull it until it clicks.
11. Carefully pull the PCI Hot Plug LED Board away from the inside of the chassis and place it on an antistatic surface.

Installing the PCI Hot Plug LED Board

To install the PCI Hot Plug LED Board, complete the following steps:

1. Observe all safety and ESD precautions for handling electronic components.
2. Carefully place the PCI Hot Plug LED Board on the inside back of the server chassis in such a way as to line up the four, black pin receptacles with their respective holes.

NOTE	It is suggested that you place a piece of paper on the inside of the chassis just below the board as you insert the black retaining pins as a safeguard should they slip from your fingers.

3. Press the pins through the holes in the board and through their receptacles in the chassis.
4. Connect the cable to the PCI Hot-Plug LED Board.
5. Attach the non-hot plug PCI adapter board cover to the chassis and secure it with the screw.
6. Close the rear part of the top cover and secure it by tightening the two thumbscrews in the back.
7. Install the power cords.
8. Push the server back into the equipment rack.
9. Power-on the system.
10. Turn on all peripheral devices connected to the system that you shut down during this procedure.

Legacy I/O Board

The Legacy I/O Board is plugged into the I/O Baseboard in the rear of the chassis. It is accessible only when you remove or lift the non-hot plug PCI adapter board cover.

Removing the Legacy I/O Board

To remove the Legacy I/O Board, complete the following procedure:

1. Observe all safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Removing the power cords ensures that the server is not under standby power.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

4. Pull the chassis out of the rack as far as it will go.
5. Label and disconnect all peripheral cables attached to the Legacy I/O board's back panel on the back of the system.
6. Loosen the two thumbscrews in the back of the chassis that secure the rear cover.
7. Lift the rear cover to expose the non-hot plug PCI adapter board cover.
8. Loosen the screw that secures the non-hot plug PCI adapter board cover.
9. Grasp the cover by its exposed, long side and lift the cover away from the chassis. You can completely remove the cover if you want by unseating the slotted hinge. Access is now available to the Legacy I/O board.
10. Release the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis.
11. Loosen and remove the screw that secures the end of the board at the rear of the chassis.
12. Carefully grasp the board and gently slide it up so that you can access the cables described in the next two steps.
13. Remove the server management cable from the Legacy I/O board.

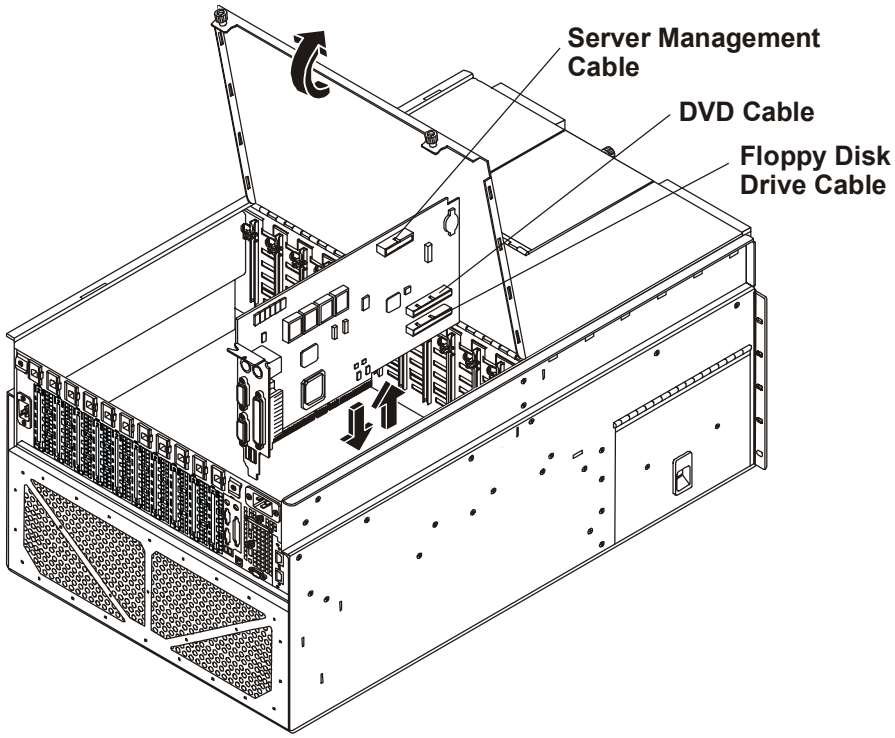


Figure 8-6. Removing Legacy I/O Board

14. Remove both IDE cables (DVD and Floppy Disk Drive) from the Legacy I/O board by grasping the ends of the cable connectors and rocking them out of their respective connectors.
15. Carefully lay the board component side up on an antistatic work surface or inside proper packaging.

Installing the Legacy I/O Board

To install the Legacy I/O Board, complete the following procedure:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Be sure that the plastic retaining mechanism (I/O Card Guide) that secures the end of the board nearest the front of the chassis is open so that it will allow a board to be inserted.

NOTE	Being careful not to touch the components or gold edge connectors on the I/O Legacy board, remove it from its protective wrapper, and place it component-side up on a nonconductive, antistatic surface within reach of the primary and secondary IDE cables in the server.

3. Record the serial number of the board in your equipment log.
4. Connect the primary and secondary IDE cables to their respective connectors on the I/O Legacy board.
5. Connect the server management cable to the Legacy I/O board.
6. Press the board down firmly until it seats in its slot.
7. Attach the rear screw that secures the board to the chassis.

8. Close the plastic latching mechanism that secures the end of the board nearest the front of the chassis.
9. Install the non-hot plug PCI adapter board cover by aligning the slotted hinge into the chassis housing, closing the cover, and securing the cover screw.
10. Close the rear part of the top cover and secure it by tightening the two thumbscrews in the back.
11. Attach any peripherals to the rear panel of the Legacy I/O board.
12. Install the power cords to the system.
13. Push the system into the equipment rack.
14. Power-on the system.
15. Turn on all peripheral devices connected to the system that you shut down during this procedure.

Changing the Legacy I/O Board Battery

The lithium battery on the Legacy I/O board powers the real-time clock (RTC) for three to four years in the absence of power. When the battery weakens, it loses voltage and the system settings stored in CMOS RAM in the Real Time Clock (such as the date and time) can be wrong. Contact your customer service representative or dealer for a list of approved devices.

WARNING	There is a danger of explosion if the battery is incorrectly replaced. Replace the battery only with the same or an equivalent type recommended by the equipment manufacturer.

Removing the Battery

To remove the battery, complete the following steps:

1. Observe the safety and ESD precautions at the beginning of this chapter.
2. Remove the Legacy I/O board as described in "Removing and Installing the Legacy I/O Board" on page 126.
3. Insert the tip of a small flat-bladed screwdriver or equivalent under the plastic tab on the snap-on plastic retainer holding the battery on the Legacy I/O board.
4. Gently push down on the screwdriver to lift the battery.
5. Remove the battery from its socket.
6. Dispose of the battery according to local ordinance.

Installing the Battery

To install a new battery, complete the following steps:

1. Remove the new lithium battery from its package and, being careful to observe the correct polarity, insert it in the battery socket.
2. Close the plastic tab over the battery.
3. Install the Legacy I/O board as described in "Removing and Installing the Legacy I/O Board" in this chapter.
4. Close the rear portion of the top chassis cover.

Power Distribution Board (T-Docking)

The Power Distribution Board (T-Docking) resides in the upper front half of the chassis above the 172 mm fans. You can access it by removing the top cover of the chassis and removing the Hard Drive Bay.

Removing the Power Distribution Board (T-Docking)

1. Observe all safety and ESD precautions for handling electronic components.
2. Turn off all peripheral devices connected to the system.
3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Removing the power cords ensures that the server is not under standby power.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended.

4. Remove the top cover as described in "Removing the Top Cover" in Chapter 2.
5. Remove all power supplies as described in "Hot Swapping Power Supplies" in Chapter 3.
6. Disconnect the data and power cables from the DVD and the LS120 drive. Place the cables in the I/O bay area.
7. Disconnect the Server Management cable from the Power Distribution Board (T-Docking).
8. Disconnect the Internal SCSI cable from the I/O Baseboard.
9. Loosen the captive screw on top of the Power Distribution Board (T-Docking) bracket and remove the bracket.

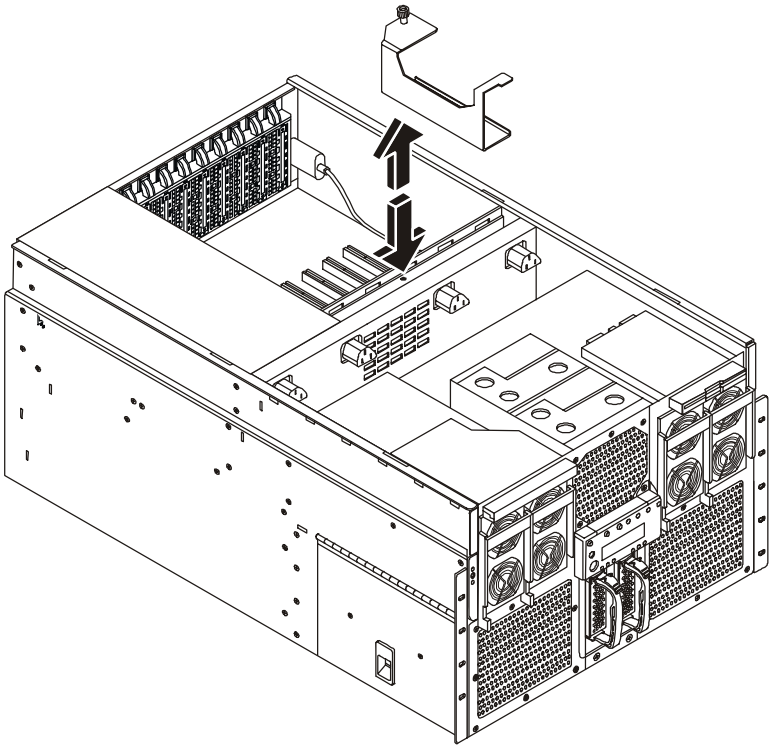


Figure 8-7. Removing the Power Distribution Board (T-Docking)'s Top Bracket

10. Remove the 12 V DC-DC converter from the top of the Power Distribution Board (T-Docking).
11. Remove the fan, DVD, and floppy drive cable power connector from the Power Distribution Board by squeezing the lock tab and carefully pulling the connector upwards.
12. Loosen the two top captive screws from the AC Power Distribution Bracket. Lift the AC distribution bracket out of the way and disconnect the AC input cables from both connectors.

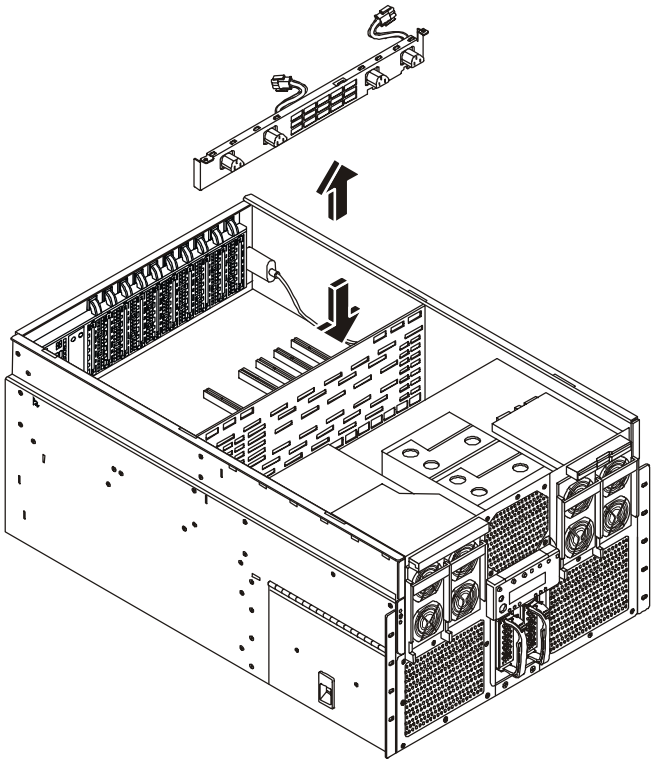


Figure 8-8. Removing the AC Distribution Bracket

13. Loosen the six captive thumbscrews securing the Power Distribution Board plastic overlay. Remove the overlay.
14. Remove the two hot swap drives from the Hard Drive Bay.
15. Remove the four screws securing the Hard Drive Bay and pull the bay completely out of the chassis.

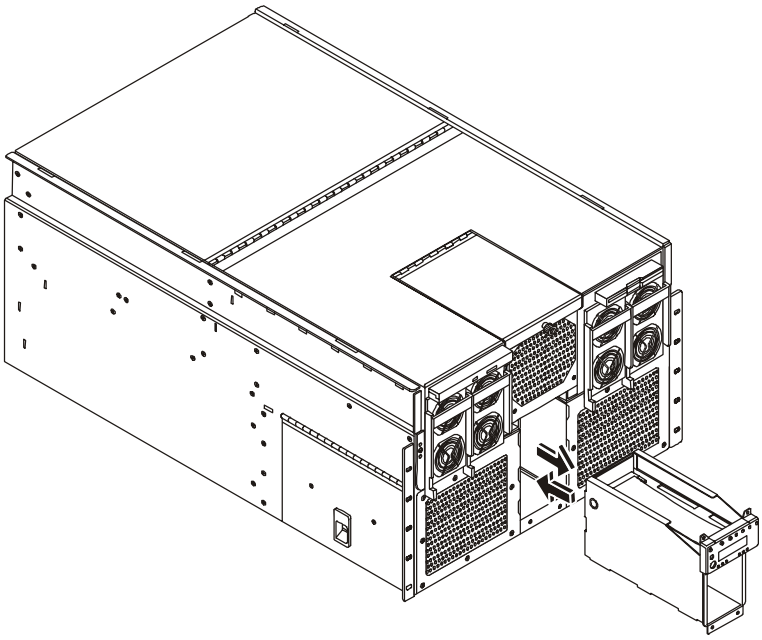


Figure 8-9. Removing the Hard Drive Bay from the Chassis

16. Disconnect the two 172 mm fan cables from the bottom side of the Power Distribution Board (T-Docking). You can access these cables from the emptied Hard Drive Bay.
17. Lift the small handle mounted to the top of the Power Distribution Board (T-Docking) near the Sideplane to disengage the Power Distribution Board (T-Docking) from the Sideplane.
18. Grasp the Power Distribution Board (T-Docking) by the right-rear edge and lift up to remove it from the chassis.

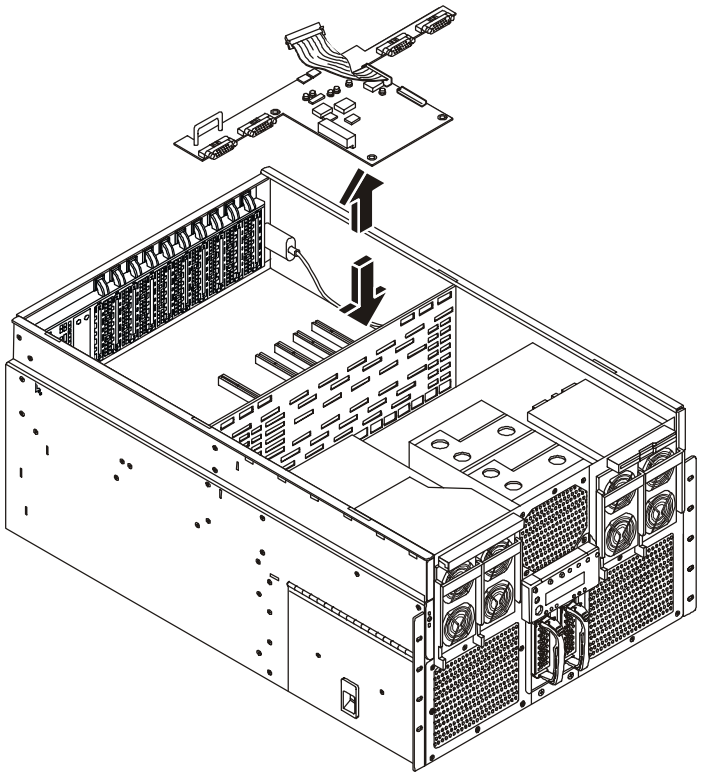


Figure 8-10. Removing the Power Distribution Board (T-Docking)

Installing the Power Distribution Board (T-Docking)

To install the Power Distribution Board (T-Docking), complete the following procedure:

1. Remove the U-shaped handle on the original Power Distribution Board (T-Docking) and attach it to the replacement board.
2. Place the Power Distribution Board (T-Docking) into position, taking care to locate the board over the indexing stake in the middle and not over the SCSI cable.
3. Engage the connector on the side of the Power Distribution Board (T-Docking) to the Sideplane. Be sure that the connector on the Power Distribution Board (T-Docking) is aligned correctly with the Sideplane before pressing the board down.
4. Connect the 172 mm fan cables to the underside of the Power Distribution Board (T-Docking). You can make the connection through the emptied Hard Drive Bay.
5. Reinsert the Hard Drive Bay and secure the four front screws.
6. Reinsert the two hot swap drives into the Hard Drive Bay.
7. Connect the Internal SCSI cable to the I/O Baseboard.
8. Install the 120 mm fan cable into the top of the Power Distribution Board (T-Docking).
9. Connect the DC-DC converter to the top of the Power Distribution Board (T-Docking).
10. Connect AC input cables to both connectors on the AC Power Distribution bracket.
11. Align the AC input bracket and install the two screws to secure it.

12. Install the bracket between the 120 mm fan housing and the AC input bracket. Make sure that the fan cable can reach the connector on the Power Distribution Board (T-Docking).
13. Install the Server Management cable.
14. Connect the power and data cables to the DVD and LS120 drives.
15. Install the power supplies.
16. Install the top cover as described in “Replacing the Top Cover” in Chapter 2.

9 Connecting the Monitor, Keyboard, and Mouse

Introduction

The PS/2 compatible keyboard and mouse connectors as well as the connection for the monitor are mounted on the rear panel of the server. The keyboard, mouse, and monitor should be plugged in before powering up the HP Server rx4610. The BIOS detects these peripherals and configures them accordingly.

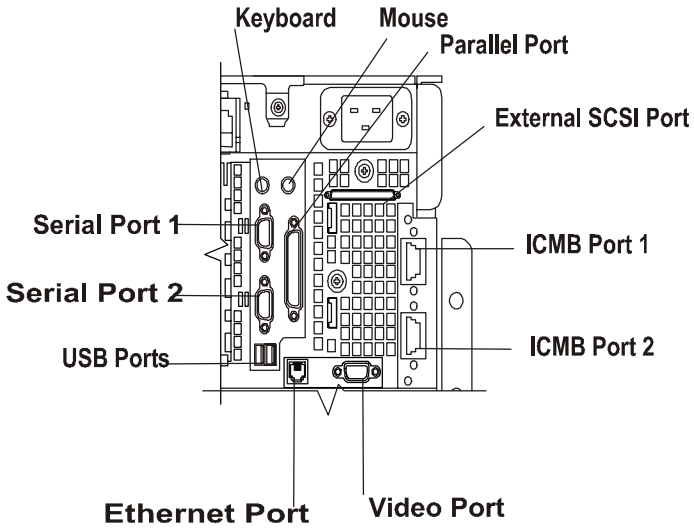


Figure 9-1. Rear Panel Ports

Use this procedure to connect the peripheral control devices and monitor to the HP Server:

CAUTION	The Keyboard and Mouse ports are both PS/2 ports, but are not interchangeable. If you plug the keyboard into the Mouse port, or the mouse into the Keyboard port, you will get an error message and the system will not finish the boot process.

1. Connect the monitor, keyboard, and mouse to the HP Server using the connections provided on the rear of the chassis. See Figure 9-1.

NOTE The two USB connectors are reserved for printers, scanners, and external modems, but not the keyboard or mouse.

If you have a console switch box, refer to the switch box's user guide for instructions on connecting the keyboard, mouse, and monitor.

2. If a LAN connector is provided, you may connect it now, or wait until you have verified the HP Server's operation.

10 Configuring the HP Server

Introduction

This chapter provides instructions for the utilities provided with your HP Server. It supplements the basic installation steps provided in the "HP Server rx4610 Installation Guide". The CD-ROM shipped with your server contains the latest information regarding the various software and firmware utilities.

Configuring the HP Server

These utilities are used for powering on the system, modifying the standard configuration, initial server set up, testing functionality, and upgrading your server. The following procedures are described below:

- Power-on Sequence and Power-on Self Test
- EFI Boot Manager
- Server Management Configuration Utility
- BIOS Setup Utility
- QLogic SCSI Utility
- SELViewer Utility
- SDR Viewer Utility
- IFlash64
- FWUpdate
- FDUSDR

Power-on Sequence and Power-on Self Test (POST)

Turning on the system causes POST to run and control to pass to the Boot Manager. From the Boot Manager, you can choose to invoke the EFI Shell or you can choose to go to the Boot Maintenance Menu. For information on the Boot Manager, refer to "The Extensible Firmware Interface (EFI) Boot Manager". For information on the EFI Shell, refer to "The Extensible Firmware Interface (EFI) Shell".

Follow these steps to power up the HP Server:

1. Press the Power on/off button on the Front Control Panel. Pressing this button causes the server fans to start up and POST begins to run. You can monitor boot progress in two different places: the video display and the LCD display on the Front Panel. Information appears in the LCD display first.

NOTE To enter the BIOS Setup Utility you must immediately start pressing <F2> repeatedly after you first power on the server. Doing so interrupts the boot process

and allows you to use the utility. For more information on entering and using the utility, refer to "Using BIOS Setup" in this chapter.

2. POST begins running. POST checks the drive carriers, processors, memory, keyboard, and most installed peripheral devices. During the memory test, POST displays the amount of memory it is able to access and test. The length of time needed to test memory depends on the amount of memory installed. POST is stored in flash memory.
3. The LCD displays boot progress as follows:

   ```
   Boot,First Row Test (should always be 64MB)
   Base Memory Test (2GB max)
   Ext Memory Test (will report out if enough memory is available)
   CMOS Test
   Keybrd Bat Test
   Initialize Timer
   PCI Bus Scan
   Initialize Video
   Keyboard Test
   Initialize IDE
   Serial Test
   Prepare to Boot
   Processor Speed
   ```

4. Video appears on the monitor attached to the system and begins to display boot progress.
   - AMI BIOS banner: displays the loaded versions of the BIOS, PAL, SAL, and EFI.
   - QLogic banner: allows you the opportunity to enter the QLogic SCSI utility by entering the key combination <Alt-Q>. The QLogic SCSI utility allows you to manage and configure the server's SCSI devices. For information on the screens available in this utility, refer to "QLogic SCSI Utility".
5. POST concludes and passes control to the Boot Manager.
6. From the Boot Manager, you can use arrow keys to highlight the option that invokes the EFI Shell, or you can highlight and select the Boot Maintenance Menu. Booting to the EFI Shell causes the following prompt to appear:

   ```
   Shell>
   ```

7. When you see the Shell> prompt, load and start the operating system.

The Extensible Firmware Interface (EFI) Boot Manager

The EFI Boot Manager allows you to control the server's booting environment. Depending on how you have configured the boot options, after the server is powered up the Boot Manager presents you with different ways to bring up the system. For example, you can boot to the EFI Shell, to an operating system located on the network or residing on media in the server, or the Boot Maintenance Menu.

EFI Shell	A simple, interactive environment that allows EFI device drivers to be loaded, EFI applications to be launched, and operating systems to be booted. In addition, the shell also provides a set of basic commands used to manage files and the system environment variables. For more information on the EFI Shell, refer to "The Extensible Firmware Interface (EFI) Shell".
Boot Options	Files that you include as boot options. You add and delete boot options by using the Boot Maintenance Menu. Each boot option specifies an EFI executable with possible options. For information on the Boot Maintenance Menu options, refer to Table 10-1.
Boot Maintenance Menu	A menu of items that let you configure boot options and configure other boot environment variables.

Table 10-1 describes each menu item in the Boot Maintenance Menu.

Table 10-1. Boot Maintenance Menu Options

Option	Description
Boot from a File	Automatically adds EFI applications as boot options or allows you to boot from a specific file. When you choose this option, the system searches all the EFI System Partitions in the system. For each partition it looks for an EFI directory. If the EFI directory is found, then it looks in each of the subdirectories below EFI. In each of those subdirectories, it looks for the first file that is an executable EFI Application. Each of the EFI Applications that meet this criterion can be automatically added as a boot option. In addition, legacy boot options for A: and C: are also added if those devices are present. You can also launch a specific application without adding it as a boot option. In this case the EFI Boot Manager searches the root directories and the \EFI\TOOLS directories of all of the EFI System Partitions present in the system for the specified EFI Application.
Add a Boot Option	Adds a boot option to the EFI Boot Manager. You specify the option by providing the name of the EFI application. Along with the name you can also provide either ASCII or UNICODE arguments the file might use. Given the EFI application name and any options, the EFI Boot Manager searches for the executable file in the same partitions and directories as described in "Boot from a File" option. When the file is found, it is executed.
Delete Boot Options	Allows the user to delete a specific boot option or all boot options.
Change Boot Order	Allows the user to control the relative order in which the EFI Boot Manager attempts boot options. For help on the control key sequences you need for this option, refer to the help menu.
Manage BootNext Setting	Allows the user to select a boot option to use one time (the next boot operation).
Set Automatic Boot Timeout	Allows you to define the value in seconds that pass before the system automatically boots without user intervention. Setting this value to zero disables the timeout feature.
Close Redir & Return EMP Mode to Active	Allows you to switch the COM2 from the system port (used for redirection) and gives control of the COM2 port to EMP (Emergency Management Port).
Cold Reset	Performs a platform-specific cold reset of the system. A cold reset traditionally means a full platform reset.

Option	Description
Exit	Returns control to the EFI Boot Manager main menu. This will display the active boot devices, including a possible integrated shell (if the implementation is so constructed).

The Extensible Firmware Interface (EFI) Shell

The EFI Shell is an EFI application that allows other EFI Applications to be launched. The combination of the EFI firmware and the EFI Shell provide an environment that can be modified to easily adapt to many different hardware configurations. The EFI shell is a simple, interactive environment that allows EFI device drivers to be loaded, EFI applications to be launched, and operating systems to be booted. In addition, the shell also provides a set of basic commands used to manage files and the system environment variables.

After booting the server to the EFI Shell, you have all its commands available to you. Table 10-2 provides a brief description of the commands.

In addition to shell commands made available to you, the EFI environment allows you to create your own shell commands and EFI applications. For detailed information about the EFI Shell, its commands, and the ability to develop within the environment, refer to the EFI Developer's Guide. To find this guide, you must download the "EFI sample implementation source code" from the sample implementation download area of the Extensible Firmware Interface Web Site. Go to the following URL and click on the "EFI sample implementation source code". Once you download the sample, locate the Microsoft Word file named "Efi_dg.doc" in the "Notes" folder.

http://developer.intel.com/technology/efi/downsource.htm.

Table 10-2. EFI Shell Commands

Command	Description
<drive_name>:	Changes drives. For example, entering a: and pressing the <ENTER> key changes the drive to the LS120 drive.
alias [-bdv] [sname] [value]	Sets or gets alias settings
attrib [-b] [+/- rhs] [file]	Views or sets file attributes
bcfg -?	Configures boot driver & load options
cd [path]	Updates the current directory
cls [background color]	Clear screen
comp file1 file2	Compare two files
cp file [file] ... [dest]	Copy files and directories
date [mm/dd/yyyy]	Gets or sets the date
dblk device [Lba] [Blocks]	Hex dump of BlkIo Devices
dh [-b] [-p prot_id] | [handle]	Dumps handle info
dmpstore	Dumps variable store
echo [[-on | -off] | [text]	Echos text to stdout or toggle script echo
Edd30 [On | Off]	Enables or Disables EDD 3.0 Device Paths
edit [filename]	Edits a file

Command	Description
endfor	Delimiter for loop constructs (scripts only)
endif	Delimiter for IF THEN constructs (scripts only)
err [level]	Sets or displays error level
for var in <set>	Loop constructs (scripts only)
goto label	Jumps to label locations (scripts only)
guid [-b] [sname]	Dumps known guid ids
help [-b] [internal_command]	Displays help information.
if [not] condition then	Conditional construct (scripts only)
load driver_name	Loads a driver
ls [-b] [dir] [dir] ...	Obtains directory listing
map [-bdvr] [sname[:]] [handle]	Maps sname to device path
mem [address] [size] [;MMIO]	Dumps Memory or Memory Mapped IO
memmap [-b]	Dumps memory map
mkdir dir [dir]	Makes a directory
mm address [Width] [;Type]	Memory Modify: Mem, MMIO, IO, PCI
mode [col row]	Sets or gets the current text mode
mount BlkDevice [sname[:]]	Mounts a file system on a block device
PalProc arg1 [arg2] [arg3] [arg4]	Makes a PAL call
pause	Prompt to quit or continue (scripts only)
pci [bus_dev] [func]	Displays PCI device information
reset [/warm] [reset_string]	Performs a cold or warm reset
rm file/dir [file/dir]	Removes files or directories
set [-bdv] [sname] [value]	Sets or gets environment variables
stall microseconds	Delays for the specified number of microseconds
time [hh:mm:ss]	Gets or sets the time
type [-a] [-u] [-b] file	Displays the contents of a file
ver	Displays version information
vol fs [volume_label]	Sets or displays a volume label

Server Management Configuration Utility

The Server Management Configuration Utility (SM Config) is an EFI-based program used to view or modify the Server Management firmware configuration data. The firmware configuration is maintained by the BMC. The executable program for the utility is named SMconfig.efi. SM Config provides the following functions:

- Configure the Emergency Management Port (EMP) for remote server management over a modem or direct serial connection.
- Configure the Direct Platform Control over LAN feature (DPC\LAN) for remote server management over the network.
- Configure power restoration policies when the system loses AC power.
- Set the accelerated cool-down timeout.
- Set the Fault Resilient Boot (FRB) timeout.
- Configure the Advanced Configuration and Power Interface (ACPI) features.
- Enable or disable Platform Event Filtering (PEF) and Platform Event Paging (PEP).

Running the Server Management Configuration Utility

Follow these steps to run the SM Config Utility:

1. Boot to the EFI Shell.
2. Change to the SMCONFIG directory located on the EFI Based Offline Utilities disk.
3. Load the IPMI driver by typing the following command:

   `load ipmi.efi`

4. Run the utility by typing the following command:

   `smconfig`

The utility automatically loads configuration data from the smconfig.ini file. This data is used to build the contents of the Config Data pull-down menu in the utility

Main Window

The SM Config pull-down menu lets your select the main features of the utility. To access menu items, use the arrow keys. Press the **<Enter>** key to select a menu item. A brief description of each menu item is displayed in the tip-view window at the bottom of the screen.

File Open

When an **`ini`** file is opened, SM Config validates the contents of the smconfig.ini file and updates the Config menu with the configuration items in the smconfig.ini file.

Updating/Viewing Config Data

The Config menu contains a dynamic list of options that corresponds to the configuration classes in the smconfig.ini file. Each configuration class in the `smconfig.ini` file represents a configuration item, such as EMP or PEP.

When you select an item from the Config menu, the utility reads the configuration data of that item from the BMC and creates a setup page containing those values. The setup pages may have drop-down boxes, edit boxes, and/or buttons. Use the **<Tab>, <F5>,** or **Down arrow** keys to move forward, and use **<F6>** or **Up arrow** keys to move backwards between each item.

Press the **<Enter>** key while on a drop-down box to display the other options available. Then use the arrow keys to move up or down the list. Press the **<Enter>** key to select an item from the drop-down box. Each item in the drop-down boxes displays a brief description in the tip-view window. Use the **<Esc>** key to exit from any level of the configuration to a previous level.

Save the configuration data by selecting the **<Save>** button and pressing **<Enter>**. Use the **<Cancel>** button or **<Esc>** key to abort changes and return to the main window.

Platform Setup

The Platform setup page lets you configure platform-specific features, including the accelerated cool-down period.

Accelerated Cool Down

This feature lets you enable the system to cool down more rapidly when the system is powered off. Set the accelerated cool-down timeout in seconds. The range is 0 to 65535 seconds. If accelerated cool-down is enabled, that is, the cool-down time is not 0, the BMC leaves the system fans running for the specified time after the system is powered down.

Power Setup

The Power setup page is used to configure these power features:

Power Feature	Description
Power Restore Policy	Determines what happens when the system loses and then regains AC power. The choices are: • Always on: The system is powered on after AC power is restored. • Always off: The system will be left powered off after AC power is restored. • Restore Power state: The system is restored to its previous on or off state before AC power was lost. This is the default.
Power Restore Delay	The delay in seconds before the power restore policy is enacted. The range is 0 to 15 seconds.
Power Cycle Delay	The delay in seconds between power cycles. The range is 0 to 255 seconds, where 0 is the default value. For this period of time after the system is turned off, the BMC ignores the front panel power switch if anyone attempts to turn the system back on.

Fault Resilient Booting (FRB) Setup

Fault Resilient Booting (FRB) allows a multiprocessor system to boot in case the bootstrap processor (BSP) fails.

FRB3 Timeout

FRB3 refers to the level of FRB in which a timer is started at system power up or hard reset. The BIOS stops this timer in the power-on self test (POST) by asserting the FRB timer halt signal to the Bus Management Controller (BMC). If the timer is not stopped, the BSP is disabled, the system is reset and another processor becomes the BSP.

This edit box lets you set the FRB3 timeout in seconds. The range is 0 to 65535 seconds. The recommended setting is 180 seconds.

Advanced Configuration Power Interface (ACPI) Setup

ACPI Setup provides the ability to configure the ACPI features described below:

ACPI Feature	Description
Button Model	Sets the power and/or sleep button model used by the system: • Power Button Only. The system supports a single power button. This is the default. • Power and Sleep Buttons. The system supports both power and sleep buttons.
State Notify	Specifies whether other server management controllers in the system will be notified upon ACPI power state changes: • Enable. Enables notification. • Disabled. Disables notification. This is the default.
Fan Control	Controls fan operation when the system enters the S1 sleep state: • Do Not Stop Fans. Fans continue to run when the system enters a sleep state. This is the default. • Stop Fans. Stops fans on a sleep state.

Platform Event Filtering (PEF) Setup

Platform Event Filtering is used to configure the actions taken when certain platform events occur. You must select **<Save>** in the PEF Setup page to actually set the filter entries.

The available event filters are:

PEF Feature	Description
PEF Enable	Enables or disables Platform Event Filter (PEF). Default=Enabled
Logging Enable	Enables or disables system event logging when an event filter is triggered. Default=Enabled

PEP Actions	Enables or disables Platform Event Paging (PEP) actions when an event filter is triggered. PEP sends a phone page when an event triggers the filter. Default=Enabled.
Power Down	Enables or disables system power down when an event filter is triggered. Default =Enabled.
Reset	Enables or disables a system reset when an event filter is triggered. Default=Enabled.
Power Cycle	Enables or disables a system power cycle when an event filter is triggered. Default=Enabled.
LAN Alert	Enables or disables sending of a LAN alert message when an event filter is triggered. Default=Enabled.
Filter Entries	This option lets you enable or disable pre-configured event filters. The recommended setting is Enable for all pre-configured event filters. Select the filter entries button and press **<Enter>** to display another setup page with a table of pre-configured event filters. Use the arrow keys to move among the options, and press the **<Space Bar>** to enable or disable a filter entry. A filter entry is enabled when an arrowhead is displayed to the left of the filter entry. The arrowhead is removed when the filter entry is disabled. Use the **<Tab>** key to move between the filter entries and the **<OK>** button. Select **<OK>** to go back to the PEF setup page. Use the **<Esc>** key to abort any selection altogether. Pre-configured Filter Entries are: Temperature Sensor, Voltage Sensor, Fan Failure, Chassis Intrusion, Power Supply Fault, BIOS (SMI Handler), BIOS Post Error, FRB Failures, Fatal NMI, Watchdog Timer Reset, System Restart(reboot).

Platform Event Paging (PEP) Setup

The Platform Event Paging (PEP) setup is used to configure the following telephone paging features.

PEP Feature	Description
Blackout Period	Enter the time, in minutes, between successive phone pages. The range is 0 to 255 minutes, where 0 disables the blackout period.
Modem Page String	Enter the paging string, which contains both the paging service number and the characters that are sent once the connection has been made. The length of the paging string is determined at run-time from firmware and it is kept in the internal use area of the BMC FRU information.

Emergency Management Port (EMP) Setup

The EMP setup enables remote server management over a modem or with a direct serial connection. The following features are available:

EMP Feature	Description
Access Mode	Set the times during system operation when EMP access over the specified port is available. The choices are: • Pre-boot only. The EMP is automatically activated when the system is powered off and during POST. • Always Active. The serial port is always dedicated for EMP use. • Always Disabled. The EMP is deactivated.
Restricted Access Mode	Enables or disables restricted mode access. When restricted mode is enabled, control operations that could disable or alter a running system via the EMP are disabled.
Connection Mode	Configures the method to connect to the EMP: • Direct Connect Mode is for applications that connect the EMP port directly to another computer system. • Modem Mode is for applications that connect the EMP port to an external modem.
Data Carrier Detect (DCD) Mode	Enables or disables monitoring of the Data Carrier Detect (DCD) signal. When DCD Mode is enabled, the EMP is activated and/or reinitialized whenever the serial port's DCD signal becomes de-asserted.
Baud Rate	Configures the maximum rate in bits per second that data is transmitted through the EMP port. Baud rates are 19200, 38400, 57600, and 115200.
Flow Control	You can disable the flow control or set it to CTS/RTS.
Modem Init String	The initialization string is transmitted every time the EMP initializes. The maximum length is 32 bytes and it is usually set to "ATE1Q0V1X4&D2&C1S0=0".
Modem Hangup String	The Hangup String is sent to the modem when the EMP terminates the session. The EMP automatically sends an **<Enter>** character after this string. The maximum length is 8 bytes and it is usually set to "ATH".
Modem ESC Sequence	The Modem ESC Sequence string is sent to the modem before sending a command string to the modem. The maximum length is 8 bytes and it is usually set to "+++".
Modem Phone Number	Enter the phone number of the modem connected to this server. The maximum length is 32 bytes. The Modem Phone Number can be retrieved and reported via in-band management connections.

EMP Feature	Description
Set Password	If set, this password restricts EMP access through the direct serial connection or modem. Select the Set Password button to display the password setup page for clearing or setting the password. You must select **<Save>** in the previous setup page to clear or set the new password to the BMC. Valid characters for this password are A-Z, a-z, and 0-9. The maximum line-length allowed is 16 characters. The password setup page consists of two edit boxes, one to enter a password, another to confirm, and an **<OK>** button. If a password already exists, both of the edit boxes display "********". To clear the old password, clear both edit boxes by selecting each box and pressing the **<Backspace>** key. To set a new password, enter the new password in both of the edit boxes. Select the **<OK>** button when done to go back to the previous setup page.

DPC/LAN (Direct Platform Control/LAN) Setup

The Direct Platform Control (DPC)/ Local Area Network (LAN) setup page lets you configure the following BMC LAN-Alert features.

DPC/LAN Feature	Description
LAN Access Mode	Sets the remote access mode. The choices are: • Disabled. A remote system cannot initiate a LAN session. • Enabled. A remote system can initiate a LAN session regardless of system state or health. • Restricted. Control operations, such as power down, front panel NMI, and reset cannot be performed.
Host IP Address	The Host IP Address is the logical or Internet Address of this server. You must enter the IP address if DHCP is disabled (see the DHCP option below). Enter the IP address as dotted notation. Example: 192.168.0.2
Subnet Mask	The Subnet Mask is the logical or Internet address of this server's subnet. The mask is used to determine if the alert destination is in the local subnet or another subnet relative to the server. You must enter the subnet mask if DHCP is disabled (see the DHCP option below). Enter the IP address as dotted notation. Example: 255.255.0.0
Gateway IP Address	This is the IP address of the gateway, or router system for the subnet. It is required when DHCP is disabled (see the DHCP option below). Enter the IP address as dotted notation. Example: 192.168.0.2
Alert IP Address	The Alert IP Address is the logical or Internet address of the system(s) to which an Alert message will be sent. For a single node destination, enter the unicast or specific IP address. For an alert to be broadcast within a particular subnet, enter the subnet IP address. Enter the IP address as dotted notation. Example: 192.168.0.2
SNMP Community String	Specify the SNMP Community String for the community field in the Header section of the SNMP trap sent for a LAN alert. The default string is "Public". The string must be 5 to 16 characters long.

DPC/LAN Feature	Description
Set Password	If set, this password restricts DPC LAN access. Select the Set Password button to display the password setup page for clearing or setting the password. The password setup page consists of two edit boxes, one to enter a password, another to confirm, and an **<OK>** button. If a password already exists, both of the edit boxes display "********". Valid characters for this password are any ASCII values [32-126] (the characters space through tilde, or ' ' through '~'). The maximum length allowed is 16 characters. To clear the old password, clear both edit boxes by selecting each box and pressing the **<Backspace>** key. To set a new password, enter the new password in both of the edit boxes. Select the **<OK>** button when done to go back to the previous setup page. You must select **<Save>** in the previous setup page to clear or set the new password to the BMC.
DHCP	Enables or disables the Dynamic Host Configuration Protocol (DHCP). If DHCP is enabled, the server automatically assigns the Host IP address, Gateway IP address and Subnet Mask. If DHCP is disabled, you must enter the Host IP address, Gateway IP address, and Subnet Mask.

Using BIOS Setup

Use the BIOS Setup Utility to change the server configuration defaults. You can run the utility with or without an operating system being present. Setup stores most of the configuration values in battery backed CMOS. The rest of the values are stored in flash memory. The values take effect when you boot the server. POST uses these values to configure the hardware. If the values and the hardware do not agree, POST generates an error message. You must then run Setup to specify the correct configuration. Run Setup to modify such server board features as:

- Select parallel port
- Select serial port
- Set time/date (to be stored in RTC)
- Configure IDE hard drive
- Enable SCSI BIOS

Starting Setup

To start Setup during the power-on sequence, follow these steps:

1. Press the Power on/off button on the Front Panel of the server.

2. Immediately begin pressing <F2> repeatedly until you see video. If the server has an Administrator password configured, you are prompted to enter the password. If the server does not have a password configured the **Main** screen of the BIOS Setup Utility appears. For information on the Setup screens, refer to "Primary Screens".

Record Your Setup Settings

Before altering any settings, record the current values. If the default values ever need to be restored (after a CMOS clear, for example), run Setup again and refer to the original settings you recorded at this time.

Navigating Setup Utility Screens

The BIOS Setup Utility consists of five primary menus. Each menu occupies a single screen and presents a list of menu items. Some menu items are sub-menus, while others are settings that you can change from the screen. The following table describes how to navigate the utility screens and menus:

Table 10-3. Using the Setup Screens

Press	To
←	Scroll left through the main menu screens.
→	Scroll right through the main menu screens.
ENTER	Select a sub-menu item or accept a drop-down choice.
TAB	Select a field within a value (e.g. date field).
F9	Select the default value.
F10	Save your changes and exit Setup.
ESC	Go back to a previous screen.
↑	Scroll up through menu items or value lists.
↓	Scroll down through menu items or value lists.

Primary Screens

The BIOS Setup Utility uses these five primary screens:

Main	Displays the BIOS version, processor type, and lets you configure the system time and date. For details on this screen, see Table 10-4.
Advanced	Lets you configure boot settings, configure peripheral devices, select the IDE controller and hard disk drive, select the type of floppy drive, and configure the chipset settings. For details on this screen, see Table 10-5.
Security	Let's you establish Administrator and user passwords. For details on this screen, see Table 10-6.
System Management	Configure Console Redirection and Service Boot options. For details on this screen, see Table 10-7.
Exit	Exits the utility with or without saving utilities options as well as allows the management of custom settings. For details on this screen, see Table 10-8.

Main

Table 10-4 describes the menu items available on the Main screen. Default values appear in brackets.

Table 10-4. BIOS Setup Main Screen Menu Items

Menu Item	Default Value	Description
BIOS Version	[bios_version_number]	The currently loaded version of BIOS. You cannot change this value. It is displayed for informational purposes only.
Processor Type	[Intel Itanium]	The processor type. You cannot change this value. It is displayed for informational purposes only.
Processor Retest	[Disabled] Enabled	If "Enabled", BIOS will activate and retest all processors on the next system boot. This option will be automatically reset to "Disabled" on the next system boot.
Language	[English (US)] Francais (FR) Deutsch (GR) Italiano (IT) Espanol (SP)	The default language used by the BIOS.
System Time	[hh:mm:ss]	The time in hour:minute:second format.
System Date	[day mm/dd/yyyy]	The day and date in month/day/year format.

Advanced

Table 10-5 describes the menu items available on the Advanced screen. Five menu items exist on this screen. Each of these items contains sub-menus that in turn can also lead to subsequent sub-menus. Default values appear in brackets.

Table 10-5. BIOS Setup Advanced Screen Menu Items

BIOS Setup Advanced Screen Menu Items

Primary Menu Item	Sub Menu Items	Value	Description
Boot Configuration	Plug & Play O/S	[No] Yes	Configures boot settings. If the operating system that runs on the server supports plug and play operation, set this value to Yes.
	Reset Config Data	[No] Yes	Resets the configuration data after a reboot operation.
	Numlock	[Off] On	Locks the number keypad.
	ADM Graphics Mode	[Disabled] Enabled	Enables or disables the ADM graphics mode.
Peripheral Configuration	Serial Port A	[Auto] Enable Disable	Determines Serial Port A configuration at boot time. Auto causes the server to determine the Base I/O address and interrupt to use for the port. Enable requires you to supply the Base I/O address and the interrupt value. Disable causes the server to disable the port.
	Serial Port B	[Auto] Enable Disable	Determines Serial Port B configuration at boot time. Auto causes the server to determine the Base I/O address and interrupt to use for the port. Enable requires you to supply the Base I/O address and the interrupt value. Disable causes the server to disable the port.

BIOS Setup Advanced Screen Menu Items

Primary Menu Item	Sub Menu Items	Value	Description
	Parallel Port	[Auto] Enable Disable	Determines Parallel Port configuration at boot time. Auto causes the server to determine the Base I/O address and interrupt to use for the port. Enable requires you to supply the Base I/O address and the interrupt value. Disable causes the server to disable the port.
	Mode	[Bi-directional] Output Only EPP ECP	Defines the transfer mode for the Parallel Port. Bi-directional allows data transfer to and from the serve. Output Only allows data transfer from the server only. EPP specifies Enhanced Parallel Port mode. ECP specifies Enhanced Port mode.
	Onboard SCSI	[Enabled] Disabled	Enables or disables the onboard SCSI.
	Onboard NIC	[Enabled] Disabled	Enables or disables the onboard NIC.
IDE Configuration	IDE Controller	[Both] Disabled Primary Secondary	Selects the IDE controller and hard disk drive type installed in your system. Both enables both IDE controllers. Disabled disables the integrated IDE controller. Primary enables only the primary controller. Secondary enables only the secondary controller.
	Hard Disk Pre-Delay	[Disabled] 3, 6, 9, 12, 15, 21, 30 Seconds	Enabled selects the hard disk drive pre-delay. This causes the BIOS to insert a delay before attempting to detect IDE drives in the system. Disabled disables the pre-delay.

BIOS Setup Advanced Screen Menu Items

Primary Menu Item	Sub Menu Items	Value	Description
	Primary IDE Master	[drive_id] Not Installed	A drive-specific identifier for the primary IDE master device currently installed in the system. Clicking on the value displays two subsequent sub-menu items: Type and Use ARMD Drive As. Type specifies how the server perceives the device (automatically or as an ATPI device). Use ARMD Drive As specifies how to use the device (floppy or hard drive).
	Secondary IDE Master	[drive_id] Not Installed	A drive-specific identifier for the secondary IDE master device currently installed in the system. Clicking on the value displays a subsequent sub-menu item: Type. Type specifies how the server perceives the device (automatically or as an ATPI device).
Chipset Configuration	Request Bus Parking	[Disabled] Enabled	Determines whether to park on the system bus or not.
	BINIT Input	[Disabled] Enabled	Enables all host bus agents to enable BINIT observation logic.
	In-Order Queue Depth	[08]	Defines the in-order queue depth. When set to one, all agents on the host bus limit their in-order queue depth to one with no pipelining support.
	BSP Jumper Selected	[Disabled] Enabled	

BIOS Setup Advanced Screen Menu Items

Primary Menu Item	Sub Menu Items	Value	Description
	CPU Work Arounds	[Auto] Manual	Enters submenus that allow you to configure Processor Dispersal, DET stalls and other processor settings
	Memory Related Items		Enters submenus that allows you to configure System ECC, Base Memory Test Interval, Ext. Memory Test Interval, Defective DIMM Mapout and Clear Bad Memory Row Info.
Event Log Configuration	Event Logging	[Enabled] Disabled	Enabled allows logging of system events.
	Enable BERR	Disabled [Enabled]	Enable/Disable BERR event generation.
	Enable SERR	Disabled [Enabled]	Enable/Disable SERR event generation.
	Enable PERR	Disabled [Enabled]	Enable/Disable PERR event generation.
	Enable BINIT	Disabled [Enabled]	Enable/Disable BINIT event generation.
	Enable HostBus DATA ERROR	Disabled [Enabled]	Enable/Disable Data Error checking in the Processor.
	Enable HostBus ADDR PARITY	Disabled [Enabled]	Enable/Disable Address Parity checking in the Processor.
	Clear All MCA Error Record	[Disabled] Enabled	Enabled will clear MCA Error Records logged in the NVRAM.

Security

Table 10-6 describes the menu items available on the Security screen. Default values appear in brackets.

Table 10-6. BIOS Setup Security Screen Menu Items

Menu Item	Default Value	Description
Administrator Password Is	[Not Installed] Installed	The current Administrator password. To set the Administrator password, use the Set Administrator Password menu item. If a password was entered, the field value displays as Installed.
User Password Is	[Not Installed] Installed	The current user password. To set the user password, use the Set User Password menu item. If a password was entered, the field value displays as Installed.
Set Administrator Password	N/A	Clicking this menu item displays a dialog box in which you can define the Administrator password.
Set User Password	N/A	Clicking this menu item displays a dialog box in which you can define the User password. Setting a password in this menu item will allow you to set up security features such as Inactivity Timer, Security Hot Key, Clear User Password, Unattended Start and Video Blanking.

System Management

Table 10-7 describes the menu items available on the System Management screen. Default values appear in brackets.

Table 10-7. BIOS Setup System Management Screen Menu Items

Menu Item	Default Value	Description
Console Redirection	N/A	Selecting this option allows you to configure for console redirection

Service Boot	[Disabled] Enabled	Enabling this item will allow you to boot into Service Partition Boot mode. The item will be automatically reset to "Disabled" on the next system boot.

Exit

Table 10-8 describes the menu items available on the Exit screen. Default values appear in brackets.

Table 10-8. BIOS Setup Exit Screen Menu Items

Menu Item	Description
Exit Saving Changes	Lets you exit the system setup and save your changes in CMOS. Clicking on the menu item offers a prompt for which you can answer Yes or No. Either response causes you to exit the setup utility.
Exit Discarding Changes	Lets you exit the system setup and discard your changes. Clicking on the menu item offers a prompt for which you can answer Yes or No. Either response causes you to exit the setup utility.
Load Setup Defaults	Lets you load setup with the factory defaults. Clicking on the menu item offers a prompt for which you can answer Yes or No. You do not exit the setup utility.
Load Custom Defaults	Lets you load setup with custom defaults. Clicking on the menu item offers a prompt for which you can answer Yes or No. You do not exit the setup utility.
Save Custom Defaults	Lets you save the current set of values into a file that you could later load using the Load Custom Defaults menu item. Clicking on the menu item offers a prompt for which you can answer Yes or No. You do not exit the setup utility.
Discard Changes	Lets you discard the changed values you have accumulated during this setup session. Clicking on the menu item offers a prompt for which you can answer Yes or No. You do not exit the utility.

Using the SELViewer Utility

The System Event Log (SEL) viewer utility is an EFI-based program (SELView.EFI) that is used to view the System Event records stored in the non-volatile memory. Using the SELViewer Utility, you can do the following:

- Examine all system event log entries stored in the non-volatile storage area of the server.
- Clear the System Event Log (SEL) entries from the non-volatile storage area.
- Sort the SEL records by various fields such as Timestamp, Sensor Type Number, Event Description, and Generator ID.
- Display the SEL records in raw HEX format as read from the HP Server.

Running the SELViewer Utility

Follow these steps to run the SELViewer Utility:

1. Boot to the EFI Shell.
2. Change to the SELVIEW directory located on the EFI Based Offline Utilities disk.
3. Load the IPMI driver by typing the following command:

   `load ipmi.efi`

4. Run the utility by typing the following command:

   `selview`

Navigation

The SEL Viewer main window contains a display pane that shows all the SEL records. It also contains a pull-down menu, used for selecting the functions available in the SEL Viewer. The user can move between the display pane and the pull-down menu using the function key **`F10`** or the **`Tab`** key.

From the menu, the user can use the arrow keys to move around the various menu items, and use **`Return`** key to select a particular menu item. A brief help message about the option selected from the menu is displayed at the bottom of the SEL Viewer main window.

The display pane supports arrow keys, <PgDn>, <PgUp>, <Home>, and <End>. Use the **`F5`** or **`F6`** function keys to tab across the columns in the text mode display.

Graphical User Interface

The SEL Viewer main window is based on a multi-column format. The data is displayed in several columns as follows:

Num	Count of the system event being displayed. Starting with 1 and increasing by one for each event.
Timestamp	Date in hour:day:four digit year format and the time in hours:minutes:seconds
Sensor type and number	Sensor type and eight digit numeric identifier
E	Event description (based on IPMI Specification and BIOS EPS).

Generator ID.

When the utility is first invoked, it loads the SEL records from the server. The status box is displayed to indicate that the SEL Viewer is loading SEL records from the server. SEL record information is displayed as one system event per row. The interpretation of the event, event type, and event data is presented in the Event Description column. If there are no entries in the SEL, a message is displayed indicating that no entries were found.

The SEL Viewer displays the event logs in an interpreted, easy-to-understand textual form. It requires the associated .STR and .HLP files for the current language and locale. The SEL Viewer parses the .STR file to get the appropriate string messages that are displayed in the program. Since .STR is a Unicode file, it allows internationalization of the SEL Viewer.

The SEL Viewer can display event logs in raw hexadecimal format as read from the server. Table 10-10 explains the abbreviations used in the hexadecimal mode display.

Table 10-10. Abbreviations Used in Hex Mode display

Abbreviation	Description
RID	Record ID
RT	Record Type
TS	Time Stamp
GID	Generator ID
ER	Event Message Format Revision
ST	Sensor Type
S#	Sensor Number
EDIR	Event Dir and Event Type
ED1	Event Data 1
ED2	Event Data 2
ED3	Event Data 3

Pull-Down Menu – File

The File pull-down menu includes options for opening and saving system event records from and to data files, respectively. These options are listed in Table 10-11 below.

Table 10-11. File Pull Down Menu Options

Option	Description
Open	This option allows the user to open the existing SEL file
Save As	Save As can be used to save SEL data to a file if SELVIEW is being run from the LS120 drive. The file will be saved to the LS120 diskette.
Exit	This option allows the user to exit the utility.

Pull-Down Menu – SEL

The SEL pull-down menu includes options for reloading SEL entries from the server, clearing the SEL entries, viewing SEL properties, and sorting the entries by different column fields. These options are further described in the table below.

Table 10-12. SEL Menu Options

Option	Description
Reload	This option allows the user to reload the SEL entries from the server. This operation is similar to the one performed when the SEL Viewer is first invoked. The records are displayed either in the hex format or in the interpreted format, depending on the set display mode. The status box shown in Figure 19 is displayed to indicate that the SEL Viewer is loading SEL records from the server, and the message shown in Figure 21 is displayed if the SEL is empty.
Properties	This option allows the user to view the SEL properties: IPMI version, Number of Entries, Last Add Time, Last Erase Time, and Free Space Remaining. If the SEL is full, the following warning message is displayed: `Warning: System Event Log is FULL`.
Clear SEL	This option clears the SEL entries from the non-volatile storage area of the server as well as the entries from the main window table. A dialog message prompts the user for the confirmation of clearing the SEL.
Display In Hex / Display In Text	This option allows the user to toggle between the raw hexadecimal mode display and the interpreted mode display. In hex mode display, all the SEL records are displayed in raw hex format. In interpreted mode display, all the SEL records are decoded and displayed in text format. The menu item name toggles between `Display in hex` and `Display in text` to allow changing from one display mode to the other. When the display mode is changed, SEL Viewer automatically loads the SEL entries from the server to display the data in the selected mode. Display mode is toggled between text and hex, automatically, when the SEL entries are read from a file based on the data format in which the file was saved.
Sort By	This option allows the SEL entries, displayed in the SEL Viewer main window, to be sorted by different fields. When the Sort By option is selected, the user is presented with a list of fields by which the entries can be sorted. The data is then sorted by the selected field.
Help	The help menu displays detailed information about program-usage. In addition, it also displays the utility version information and IPMI driver version number.

General Help	This option displays a detailed description on how to use the SEL Viewer. The help window is divided into two windows. The top window lists all the main topics and the bottom one displays the description about the topic currently selected. Users can select different topics using the arrow keys. To move between windows, use <F10> or <Tab> keys. To dismiss the help window, press <Esc> key.

Using the SDR Viewer Utility

The SDR Viewer Utility provides the ability to display Sensor Data Record (SDR) information stored in non-volatilememory. Sensor data records contain information about the type and number of sensors in the platform, the sensor threshold support, the platform's event generation capabilities, and information on what types of readings the sensors provide. SDRs also include the records describing the number and type of devices that are connected to the system's Intelligent Platform Management Bus (IPMB), and records that describe the location and type of Field Replaceable Unit (FRU) devices.

Using the SDR Viewer Utility, you can do the following:

- Examine all SDRs from the Baseboard Management Controller (BMC)

Running the SDR Viewer Utility

To run the SDR Viewer Utility, complete the following procedure:

1. Boot to the EFI Shell.
2. Change to the SDRVIEW directory located on the EFI Based Offline Utilities disk.
3. Load the IPMI driver by typing the following command:

   `load ipmi.efi`

4. Run the utility by typing the following command:

   `sdrviewer`

Main Window

The SDR Viewer Utility is menu-driven application. The main window contains a Title Bar, Menus, a Client Area, and a Help Tip Area.

Main Window Area	Description
Title Bar	Indicates the name and version of the utility
Menu Area	Provides access to all utility functions and options through three menus: File, SDR, and Help.
Client Area	Displays in a textual format the SDR information for the selected record
Help Tip Area	Displays a brief help message about the option currently selected through the menu items

Navigation

Use the keystrokes indicated in Table 10-13 to navigate the SDR Viewer Utility's main window:

Table 10-13. SDR Viewer Utility Navigation

Keystroke or Combination	Description
↑↓	Navigate up and down menu items or scroll through displayed SDR information.
← →	Navigate between the File, SDR, and Help menus
<Pg Dn>	Scroll down through displayed SDR information.
<Pg Up>	Scroll up through displayed SDR information.
<ENTER>	Select the currently highlighted menu item.
F10	Move between the Menu and Client Areas.

Menus

The main window has three menus:

File	Lets you open and save SDR files to a LS120 diskette if SDRVIEW utility is being run from a LS120 diskette. You can also exit the utility from this menu.
SDR	Lets you view SDR properties and reload SDRs from non-volatile memory.
Help	Displays brief explanations on how to use the utility as well as copyright and version information for the utility.

Each menu has a series of commands with submenus.

Pull-Down Menu – File

The File pull-down menu includes menu items for opening and saving data files. These options are further described in the sections below.

Table 10-14. SDR Viewer Utility File Menu Selections

Menu	Selection	Description
File	Open	Allows you to open an existing SDR data file for viewing. Selecting this option prompts you to specify a file name having an .SDR file name extension. The option also provides you with the ability to browse drives and directories for existing files. If the selected file cannot be opened, the program displays an error message.
File	Save As	Allows you to save the SDR data retrieved from the system in SDR file format to a LS120 diskette if SDRVIEWER is being run from the LS120 drive.
File	Exit	Exits the SDR Viewer Utility.

Pull-Down Menu – SDR

The SDR pull-down menu includes options for viewing sensor data record properties and reloading sensor data records from the server. These options are further described in Table 10-15 below.

Table 10-15. SDR Viewer Utility SDR Menu Selections

Menu	Selection	Description
SDR	Properties	Allows you to view the general properties of SDR information. You can view the following properties: • Version: IPMI version information. • Number of Entries: Total number of entries for this Sensor Data Record. • Last Add Time: The date and time data was last added to the SDR. • Last Erase Time: The date and time data was last erased from the SDR. • Free Space Remaining: Amount of space remaining in the SDR • SDR Version: SDR version information.
SDR	Reload	Allows you to reload the SDR data from the server. This operation is similar to the one performed when you first invoke the SDR Viewer Utility.
SDR	Record Type	Displays SDR types. Selecting one of the following types causes the utility to display the associated record type in the Client Area. If no records exist for the record type selected, the utility displays an error message. Full Sensor Record SDR Type 01h

Menu	Selection	Description
		Compact Sensor Record — SDR Type 02h
		Entity Association — SDR Type 08h
		Generic Device Locator Record — SDR Type 10h
		FRU Device Locator — SDR Type 11h
		Management Controller Device Locator Record — SDR Type 12h
		Management Controller Confirmation — SDR Type 13h
		BMC Message Channel Information — SDR Type 14h
		OEM SDR — SDR Type 0C0h
		The sensor data record title consists of sensor type, sensor ID string, and SDR record ID

Pull-Down Menu – Help

The help menu displays detailed information about the program usage to the user. In addition, it also displays the utility version information and IPMI driver version number.

Table 10-16. SDR Viewer Utility SDR Menu Selections

Menu	Selection	Description
Help	SDR Help	Displays information on how to use the SDR Viewer Utility.
	About	Displays the version, date, and copyright information for the SDR Viewer Utility

Server Firmware

Server firmware updates do occur on occasion Go to http://www.docs.hp.com or http://www.hp.com and search for "HP Server rx4610" to check for available firmware updates.

11 Troubleshooting

Introduction

If you are having problems with installing your HP Server or booting it up, this chapter provides information on the different tools available for common installation problems, troubleshooting operational problems and error messages.

Common Installation Problems

The following sections contain general procedures to help you locate installation problems.

WARNING	Before removing the top cover, always disconnect the power cords and unplug telephone cables. Disconnect telephone cables to avoid exposure to shock hazard from telephone ringing voltages. Disconnect the power cord to avoid exposure to high energy levels that may cause burns when parts are short-circuited by metal objects such as tools or jewelry. The power switch does NOT turn off the standby power. Disconnect the power cord from the HP Server before handling components.

CAUTION	Replace the top cover before operating the HP Server, even for a short time. Otherwise, overheating can damage chips, boards, and mass storage devices. However, you can safely remove the PCI access panel while the HP Server is running to remove and replace PCI Hot Plug boards. For any other service activity requiring access to the processor baseboard or I/O baseboard, power down the HP Server and observe all safety precautions.

Troubleshooting Sequence

Most HP Server problems are the result of incorrect HP Server and SCSI subsystem configurations. To troubleshoot an installation problem, perform the following checks in the order given:

1. Check all cable and power connections, including those in the rack, etc.
2. Ensure the HP Server is configured properly.
   - ◊ Check the Setup Utility.
   - ◊ If the error is a network-related problem, determine if the HP Server has enough memory and hard disk drive capacity.
   - ◊ Consult your network operating system manual.
3. Verify all cables and boards are securely plugged into the appropriate connectors or slots.
4. Remove all extra options one at a time, checking its affect on the HP Server.
5. Unplug the power cord, wait 20 seconds, plug the power cord in again, and restart the HP Server.

6. If you suspect a hardware error, follow these steps:
   a. Log users off the LAN and power down the HP Server.
   b. Extend the HP Server out of the rack and remove the top cover.
   c. Simplify the HP Server configuration to the minimum required:
      * Monitor
      * Keyboard
      * Mouse
      * 1 hard disk drive and 1 flexible disk drive
      * 1 DVD
   d. Remove all third-party options, and reinstall each one, one at a time, checking the HP Server after each installation.
   e. Replace the top cover and reconnect the power cord and other cables.
   f. Boot the HP Server and if it does not function properly, refer to the following procedures.

If the HP Server Will Not Power On

Use these steps to check for power related problems:

1. On the control panel, verify the LCD screen's backlight is lit (green glow).
   a. If it is lit, the HP Server is receiving AC power.
   b. If it is not lit, ensure the HP Server's power cords are connected.
2. Check the HP Server's power supplies.
   a. Check that at least three power supplies and both power cords are plugged in to the chassis.
   b. Each power supply has three LEDs and the top LED is the Power (PWR) LED.
      * The top PWR LED glows a steady green when the HP Server's DC power has been switched on.
      * The PWR LED will blink green, if the DC power is switched off, but AC power is properly connected.
3. If the PWR LED on any power supply is not a steady green, reseat the power supply.
4. You can release the lever and then reset it, or remove the power supply from the HP Server.
5. If all power supply LEDs are still blinking green, the HP Server might be in a sleep state.

   Refer to your NOS's instructions concerning sleep states.
6. Check that the boards are properly seated.

If the HP Server Powers On but then Shuts Down with a Fault Light

Use this checklist to check for the following problems when the HP Server powers on and then off:

1. Check that a conductive item has not been dropped or left inside the server chassis.
2. Check the connections on all boards.
3. Check the cables for bent pins.

4. Check the processors for bent pins.

If the HP Server Powers On but Fails POST (Power-On Self Test)

Use this checklist to check for the following problems when the HP Server fails POST:

1. Clear CMOS and see if the HP Server boots.

   Check the HP Server's reference label for instructions on clearing CMOS.

2. If the monitor is working, check the POST pass code it displays.

   If the code is between #0 and 3Ah, and the code does not change,

   a. Reseat the HP Server's memory boards and then reboot the HP Server.

   b. Swap out the Legacy I/O Board and reboot the server

3. If clearing the CMOS does not solve the problem, refer to "If the HP Server Passes the Post but Will Not Function" later in this chapter.

If the HP Server Hangs at POST Codes F0-F2

Use these steps to solve the POST error problems:

1. Inspect the Memory Board for defects.
2. Ensure that all of the DIMMs are properly seated.
3. Swap out the suspect DIMMs and reboot the HP Server. If this does not resolve the problem, swap out the Memory Board.

If the HP Server Passes POST but Will Not Function

Use these steps to solve POST error problems.

1. If an error message displays on the screen, read the error message text for recommended actions to take.
2. If the actions do not solve your problem, contact your reseller.
3. If there is no error message, follow these steps:

   a. Turn off the HP Server and remove all external peripherals, except the monitor and keyboard.

   b. Boot from an internal hard drive and verify that the HP Server becomes operational.

   c. If the HP Server still is not operational, turn off the monitor, the HP Server, and all external devices, and check the internal hardware, as follows:

      i. Unplug the power cord and all telephone cables.

      ii. Swap out the Legacy I/O Card and reboot the HP Server.

      iii. Check that all accessory boards, power pods, and processors are firmly seated in their slots.

      iv. Verify that the DIMMs are inserted in the proper order and firmly seated on the memory board.

      v. Verify that the DIMMs in any given row are the same size and have the same Hewlett-Packard part number.

vi. Ensure all disk drive power and data cables are securely and properly connected, at the rear of each drive.

vii. Verify the mass storage configuration with the cabling and switch diagrams.

viii. Replace the HP Server cover.

ix. Replace all power cords and power cables.

x. Turn on the monitor.

xi. Turn on the HP Server at the control panel.

xii. Check for error messages.

If the HP Server Passes POST but a Processor is Disabled or Not Recognized

If a processor is not recognized by the Server, check the following items:

1. Verify that the pins on the processors are not bent and that the processor is properly seated.
2. Verify that the power pod is fully engaged into the processor and seated properly.
3. Check the power cable from the Processor Baseboard to the power pod connectors.

If steps one to three above are complete and the processor is still disabled during the HP Server's power-on self-test (POST), you can re-enable it through the BIOS Setup Utility:

4. Power up the server.
5. Start the BIOS Setup Utility by pressing F2.
6. Under the Main menu, enable Processor Retest.

   The next time the system is booted, the BIOS retests all processors and enables them. On a subsequent boot, Processor Retest is automatically disabled.

If the 172 mm or 120 mm Fans Do Not Operate

Check the following items if the fans do not operate:

1. Reseat the Fans.
2. Verify that the fan cables are properly connected.

If the HP Server Has No Video and POST is Stuck in Reset

Check the following if there is no video display:

1. Check that all accessory boards, power pods, and processors are firmly seated in their slots.
2. Replace the Power Pod.

If the HP Server's SCSI Drives Are Not Recognized

Check the following if the SCSI drives are not recognized during POST:

1. Reseat the disk drive.
2. Check that the SCSI drives are enabled in the BIOS Setup.

If the HP Server's IDE Drives Are Not Recognized

Check the following if the IDE drives are not recognized during POST:

1. Check the seating of the IDE cables and power cables.
2. Check that the IDE drives are enabled in the BIOS Setup.

HP Server rx4610 SEL Data Tables

The tables in this appendix provide information on the SEL viewer data on the HP Server rx4610 server platform.

HP Server rx4610 Sensor Codes

Sensor Type	Sensor Number	Sensor Name
00		**Spare Sensor**
	09	Spare Sensor 1
	14	Spare Sensor 2
01		**Temperature**
	01	Backplane (HSC TeeDock) Temperature
	02	HSC SCSI Backplane Temperature
	21	Processor 0 Core Temperature
	22	Processor 1 Core Temperature
	23	Processor 2 Core Temperature
	24	Processor 3 Core Temperature
	25	Upper Memory Board Temperature
	26	Lower Memory Board Temperature
	27	Sideplane Temperature
	28	I/O Board Temperature
	29	Processor Board Temperature 1
	2A	Processor Board Temperature 2
02		**Voltage**
	07	Baseboard +1.5 Volt
	08	Baseboard +1.8 Volt
	0A	Baseboard +2.8 Volt
	0B	Baseboard +3.3 Volt
	0C	Baseboard +3.3 Volt SB
	0D	Baseboard +5 Volt
	0E	Baseboard +5 Volt SB
	0F	Baseboard +12 Volt
	10	Baseboard –12 Volt
	11	Processor Board +1.5 Volt
	12	Processor Board +1.8 Volt
	13	Processor Board +3.3 Volt
	15	SCSI TERM Volt 00
	16	SCSI TERM Volt 01
	17	SCSI TERM Volt 02
	18	SCSI TERM Volt 10

	19	SCSI TERM Volt 11
	1A	SCSI TERM Volt 12
	41	Processor 0 Power Good
	42	Processor 1 Power Good
	43	Processor 2 Power Good
	44	Processor 3 Power Good
	45	Processor Board 1.5 Volt Power Good
	46	Processor Board 1.5 Volt FOK
	47	Processor Board 1.8 Volt Power Good
	48	Processor Board 1.8 Volt FOK
	49	Processor Board Sys Power Good
	4A	Processor Board Chipset
	4B	Power Supply Power OK
	4C	Upper Memory Board Power Good
	4D	Lower Memory Board Power Good
	60	Hot Swap 48 Volt FOK
04		**Fan**
	1B	F172 Tach Fan 1 (left rear)
	1C	F172 Tach Fan 2 (left front)
	1D	F172 Tach Fan 3 (right rear)
	1E	F172 Tach Fan 4 (right front)
	1F	F120 Tach Fan 5 (top rear)
	20	F120 Tach Fan 6 (top front)
06		**Security Violation Attempt**
	04	Secure Mode Violation Attempt
07		**Processor**
	35	Processor 0 Status
	36	Processor 1 Status
	37	Processor 2 Status
	38	Processor 3 Status
08		**Power Supply**
	4E	Power Supply 1
	4F	Power Supply 2
	50	Power Supply 3
	51	Power Supply 4

	52	Upper Memory Board D2D_0
	53	Upper Memory Board D2D_1
	54	Lower Memory Board D2D_0
	55	Lower Memory Board D2D_1
	56	SP 3.3 Volt CPU
	57	SP 3.3 Volt_1 D2D
	58	SP 3.3 Volt_2 D2D
	59	SP 5 Volt_1 D2D
	5A	SP 5 Volt_2 D2D
	5B	Hot Swap 12 Volt D2D
09		**Power Unit**
	01	Power Unit Status
	02	Power Unit Redundancy
0D		**Hot Swap Drive**
	03	Hot Swap Drive 1 Status
	04	Hot Swap Drive 2 Status
	05	Hot Swap Drive 1 Present (left HDD)
	06	Hot Swap Drive 2 Present (right HDD)
0F		**POST Error**
	05	BIOS POST code
13		**Critical Interrupt**
	06	FP NMI (Front Panel Diag Int)
15		**Module / Board**
	5D	Processor Board Present
	5E	Upper Memory Board Present
	5F	Lower Memory Board Present
21		**Slot / Connector**
	39	Hot Plug PCI Slot 3
	3A	Hot Plug PCI Slot 4
	3B	Hot Plug PCI Slot 5
	3C	Hot Plug PCI Slot 6
	3D	Hot Plug PCI Slot 7
	3E	Hot Plug PCI Slot 8

	3F	Hot Plug PCI Slot 9
	40	Hot Plug PCI Slot 10
23		**Watchdog**
	03	BMC Watchdog
C7		**OEM C7**
	2B	Processor 0 Fan Boost Temperature
	2C	Processor 1 Fan Boost Temperature
	2D	Processor 2 Fan Boost Temperature
	2E	Processor 3 Fan Boost Temperature
	2F	Upper Memory Board Fan Boost Temperature
	30	Lower Memory Board Fan Boost Temperature
	31	Sideplane Fan Boost Temperature
	32	I/O Board Fan Boost Temperature
	33	Processor Board 1 Fan Boost Temperature
	34	Processor Board 2 Fan Boost Temperature
	35	TeeDock Board Fan Boost Temperature

BIOS Error Codes\Messages

The following list defines the BIOS error codes on the HP Server rx4610 server system. All BIOS error codes\messages, when encountered, appears on the video and are logged in the SEL unless it is full.

The system event log record for these BIOS error codes has a sensor type of '0F'. To decode a BIOS error codes\message, use the last two bytes in the event description to identify the specific error.

0100: Timer Error

0103: CMOS Battery Low

0104: CMOS Settings Wrong

0105: CMOS/GPNV Checksum Bad

0106: CMOS Display Type Wrong

0108: Unlock Keyboard

0109: Keyboard Error

010A: KB/Interface Error

010B: Memory Size Decrease

010E: Cache Memory Error

0117: Pri Master Drive - ATAPI Incompatible

0118: Pri Slave Drive - ATAPI Incompatible

0119: Sec Master Drive - ATAPI Incompatible

011A: Sec Slave Drive - ATAPI Incompatible

011B: CMOS Date/Time Not Set

011E: Cache Memory Error

0120: NVRAM cleared By jumper

0121: Password cleared By jumper

0141: PCI Memory Conflict

0142: PCI IO Conflict

0143: PCI IRQ Conflict

0144: Shadow of PCI ROM Failed

0145: PCI ROM not found, May Be OK For This Card

0146: Insufficient Memory to Shadow PCI ROM

8100: BIST Failure : Processor in socket M0

8101: BIST Failure : Processor in socket M1

8102: BIST Failure : Processor in socket M2

8103: BIST Failure : Processor in socket M3
8110: Internal error(IERR): Processor in socket M0
8111: Internal error(IERR): Processor in socket M1
8112: Internal error(IERR): Processor in socket M2
8113: Internal error(IERR): Processor in socket M3
8120: Thermal trip failure: Processor in socket M0
8121: Thermal trip failure: Processor in socket M1
8122: Thermal trip failure: Processor in socket M2
8123: Thermal trip failure: Processor in socket M3
8130: Processor in socket M0 Disabled
8131: Processor in socket M1 Disabled
8132: Processor in socket M2 Disabled
8133: Processor in socket M3 Disabled
8140: Processor in socket M0: failed FRB level 3 timer
8141: Processor in socket M1: failed FRB level 3 timer
8142: Processor in socket M2: failed FRB level 3 timer
8143: Processor in socket M3: failed FRB level 3 timer
8150: Processor in socket M0: failed initialization on last boot
8151: Processor in socket M1: failed initialization on last boot
8152: Processor in socket M2: failed initialization on last boot
8153: Processor in socket M3: failed initialization on last boot
8190: Watchdog timer failed on last boot
8191: 2:1 core to bus speed ratio: Processor L2 cache disabled
8192: L2 cache size mismatch
8193: CPUID, Processor stepping are different
8194: CPUID, Processor family are different
8195: Front side bus speed mismatch. System Halted
8196: CPUID, Processor model are different
8300: Baseboard Management Controller failed to function
8305: Hotswap Controller failed to function
84F1: Intelligent System Monitoring Forced Shutdown
84F2: Server Management Interface Failed
84F3: Baseboard Management Controller in Update Mode
84F4: Sensor Data Record Empty

84FF: System Event Log Full

8C02: ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED OUT ON THE NEXT RESET. IT IS STRONGLY SUGGESTED THAT YOU RESET THE SYSTEM NOW. ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE SYSTEM BEHAVIOR AND/OR HARD DISK CORRUPTION.

8C51: Error in memory subsystem: Lower Board, DIMM 1

8C52: Error in memory subsystem: Lower Board, DIMM 2

8C53: Error in memory subsystem: Lower Board, DIMM 3

8C54: Error in memory subsystem: Lower Board, DIMM 4

8C55: Error in memory subsystem: Lower Board, DIMM 5

8C56: Error in memory subsystem: Lower Board, DIMM 6

8C57: Error in memory subsystem: Lower Board, DIMM 7

8C58: Error in memory subsystem: Lower Board, DIMM 8

8C59: Error in memory subsystem: Lower Board, DIMM 9

8C5A: Error in memory subsystem: Lower Board, DIMM 10

8C5B: Error in memory subsystem: Lower Board, DIMM 11

8C5C: Error in memory subsystem: Lower Board, DIMM 12

8C5D: Error in memory subsystem: Lower Board, DIMM 13

8C5E: Error in memory subsystem: Lower Board, DIMM 14

8C5F: Error in memory subsystem: Lower Board, DIMM 15

8C60: Error in memory subsystem: Lower Board, DIMM 16

8C61: Error in memory subsystem: Lower Board, DIMM 17

8C62: Error in memory subsystem: Lower Board, DIMM 18

8C63: Error in memory subsystem: Lower Board, DIMM 19

8C64: Error in memory subsystem: Lower Board, DIMM 20

8C65: Error in memory subsystem: Lower Board, DIMM 21

8C66: Error in memory subsystem: Lower Board, DIMM 22

8C67: Error in memory subsystem: Lower Board, DIMM 23

8C68: Error in memory subsystem: Lower Board, DIMM 24

8C69: Error in memory subsystem: Lower Board, DIMM 25

8C6A: Error in memory subsystem: Lower Board, DIMM 26

8C6B: Error in memory subsystem: Lower Board, DIMM 27

8C6C: Error in memory subsystem: Lower Board, DIMM 28

8C6D: Error in memory subsystem: Lower Board, DIMM 29

8C6E: Error in memory subsystem: Lower Board, DIMM 30

8C6F: Error in memory subsystem: Lower Board, DIMM 31
8C70: Error in memory subsystem: Lower Board, DIMM 32
8C71: Error in memory subsystem: Upper Board, DIMM 1
8C72: Error in memory subsystem: Upper Board, DIMM 2
8C73: Error in memory subsystem: Upper Board, DIMM 3
8C74: Error in memory subsystem: Upper Board, DIMM 4
8C75: Error in memory subsystem: Upper Board, DIMM 5
8C76: Error in memory subsystem: Upper Board, DIMM 6
8C77: Error in memory subsystem: Upper Board, DIMM 7
8C78: Error in memory subsystem: Upper Board, DIMM 8
8C79: Error in memory subsystem: Upper Board, DIMM 9
8C7A: Error in memory subsystem: Upper Board, DIMM 10
8C7B: Error in memory subsystem: Upper Board, DIMM 11
8C7C: Error in memory subsystem: Upper Board, DIMM 12
8C7D: Error in memory subsystem: Upper Board, DIMM 13
8C7E: Error in memory subsystem: Upper Board, DIMM 14
8C7F: Error in memory subsystem: Upper Board, DIMM 15
8C80: Error in memory subsystem: Upper Board, DIMM 16
8C81: Error in memory subsystem: Upper Board, DIMM 17
8C82: Error in memory subsystem: Upper Board, DIMM 18
8C83: Error in memory subsystem: Upper Board, DIMM 19
8C84: Error in memory subsystem: Upper Board, DIMM 20
8C85: Error in memory subsystem: Upper Board, DIMM 21
8C86: Error in memory subsystem: Upper Board, DIMM 22
8C87: Error in memory subsystem: Upper Board, DIMM 23
8C88: Error in memory subsystem: Upper Board, DIMM 24
8C89: Error in memory subsystem: Upper Board, DIMM 25
8C8A: Error in memory subsystem: Upper Board, DIMM 26
8C8B: Error in memory subsystem: Upper Board, DIMM 27
8C8C: Error in memory subsystem: Upper Board, DIMM 28
8C8D: Error in memory subsystem: Upper Board, DIMM 29
8C8E: Error in memory subsystem: Upper Board, DIMM 30
8C8F: Error in memory subsystem: Upper Board, DIMM 31
8C90: Error in memory subsystem: Upper Board, DIMM 32

8C91: DIMMs mapped out: Lower Board, 1 - 4

8C92: DIMMs mapped out: Lower Board, 9 - 12

8C93: DIMMs mapped out: Lower Board, 17 - 20

8C94: DIMMs mapped out: Lower Board, 25 - 28

8C95: DIMMs mapped out: Lower Board, 5 - 8

8C96: DIMMs mapped out: Lower Board, 13 - 16

8C97: DIMMs mapped out: Lower Board, 21 - 24

8C98: DIMMs mapped out: Lower Board, 29 - 32

8C99: DIMMs mapped out: Upper Board, 1 - 4

8C9A: DIMMs mapped out: Upper Board, 9 - 12

8C9B: DIMMs mapped out: Upper Board, 17 - 20

8C9C: DIMMs mapped out: Upper Board, 25 - 28

8C9D: DIMMs mapped out: Upper Board, 5 - 8

8C9E: DIMMs mapped out: Upper Board, 13 - 16

8C9F: DIMMs mapped out: Upper Board, 21 - 24

8CA0: DIMMs mapped out: Upper Board, 29 - 32

FFFE: Invalid Error Number

FFFF: Reached Termination during Error Processing

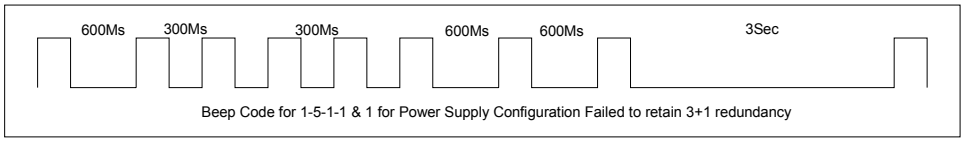
Beep Codes

Beep Codes and Interpretation

Speaker beep code generation is supported on standby and when the system is powered up. The BMC may emit the beep codes listed in the table below. The waveform below describes the timing and the sequence of the Beep code 1-5-1-1---1 for power supply configuration failed to retain 3+1 redundancy.

Table 11-1. BMC Beep Codes

Code		Description
1-5-1-1		FRB failure (processor failure)
1-5-2-1		No processors installed/detected
1-5-4-2		Power control fault. Power-good dropped out. This beep code occurs during run time
1-5-4-4		PWRGD-BUF failure. System did not assert power-good on power-up. Check installed D2D configuration, verify processors seated, processor power pods are connected, and Legacy cable connector is secure with no bent pins. This beep code ouccrs during system power on.
1-5-5-1		CPU board interlock failure. Verify CPU board inserted fully.
1-5-4-2 OR 1-5-4-4	1	Power Supply Configuration Failed to retain 3+1 redundancy (1 Redundant)
	2-1	Processor1 Power Good failed due to power pod failure or not connected to 48V
	2-2	Processor2 Power Good failed due to power pod failure or not connected to 48V
	2-3	Processor3 Power Good failed due to power pod failure or not connected to 48V
	2-4	Processor4 Power Good failed due to power pod failure or not connected to 48V
	3-1	Upper Memory board power good failed.
	3-1	Lower Memory board power good failed.
	4	12V D2D Power Good failure.
	5-1	I/O 5V A D2D Power Good failure.
	5-2	I/O 5V B D2D Power Good failure.
	6	PROC 3.3V D2D Power Good failure.
	7-1	I/O 3.3V A D2D Power Good failure.
	7-2	I/O 3.3V B D2D Power Good failure.
	8-1	1.8V D2D Power Good failure (processor board only).



Beep Code for 1-5-1-1 & 1 for Power Supply Configuration Failed to retain 3+1 redundancy

Types of Memory Tests

The HP Server rx4610 platform memory test is separated into the following three individual tests:

- First Row Memory Test
- Base Memory Test
- Extended Memory Test

Each of these tests have different functions and are explained separately.

First Row Memory Test

Description

The First Row Memory Test will test the first 64 MB of the first populated row of memory configured. The scanning order for the first row of memory is described in Table 11-2.

Table 11-2. First Row Detection Order

Order	Row	Board	DIMM
1	C	Upper	5-8
2	D	Upper	13-16
3	E	Upper	21-24
4	F	Upper	29-32
5	8	Upper	1-4
6	9	Upper	9-12
7	A	Upper	17-20
8	B	Upper	25-28
9	4	Lower	5-8
10	5	Lower	13-16
11	6	Lower	21-24
12	7	Lower	29-32
13	0	Lower	1-4
14	1	Lower	9-12
15	2	Lower	17-20
16	3	Lower	25-28

Upon completion of the first row memory test, the memory testing continues with the base memory test.

If the first row test fails, there are several possible failing cases. Two failing scenarios are described in the following sections.

Case 1

The first row memory test encounters a MBE (Multi Bit Error) in the first populated row of memory configured. Irrespective of the number of DIMMs populated in the system, if the first row test encounters a MBE, the BIOS will display an error message on the front panel LCD and halt the system.

User Notification

This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel.

```
"First row test"
"Failed, sys halt"
```

User Action

This memory failure must be fixed and can only be fixed by replacing the bad row of DIMMs.

1. Replace the first row of DIMMs. Determine the location of the defective row using Table 11-2. Starting with #1 in the "Order" column, determine the "DIMM" locations (5-8 in this example) and memory board (upper in this example). If memory is populated in these DIMM locations then this is the first row and has defective memory. If not, the next set, if populated, becomes the first row. Repeat until you have determined the first memory row. On replacing the DIMMs, make sure the size and HP part number match.

2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system.

Error Logging

The defective row/DIMM(s) found during this test cannot be logged to the SEL or reported on screen.

Case 2

The system is populated with only one row of memory and the first row memory test encounters a SBE (Single Bit Error). In this case, the BIOS will write these rows into CMOS history, map out the only row of DIMMs, and halt the system.

User Notification

This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel and the system will halt.

`"First row test"` - displayed on the upper LCD line
`"0064MB"` - displayed on the lower LCD line

`"ALL DIMM MAP OUT"` - displayed on the upper LCD line

Example 1: Consider a system that is populated with only one row of 256 MB DIMMS in the upper board row 1-4. If an SBE was detected in DIMM 1 during the first row memory test, the following message will appear on the LCD:

```
"First row test"    - displayed on the upper LCD line
"0064 MB"           - displayed on the lower LCD line

"ALL DIMM MAP OUT" - displayed on the upper LCD line
```

User Action

1. Replace the first row of DIMMs. On repacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system.

Error Logging

The defective row/DIMM(s) found during this test case cannot be logged to the SEL or reported on screen.

Base Memory Test

Description

The Base Memory Test will take effect after the completion of the first row test with no errors, or with single bit errors, and if the system contains more memory to test. The base memory test will test the first 2 GB of memory. If this memory is found to be defective, the BIOS will detect the defective memory row(s), write these rows into CMOS for further processing, and display an appropriate error message on the front panel LCD. The BIOS will then force a reset of the system. During the next boot, this written history will be read from CMOS and the defective rows will be mapped out of the data path. The BIOS does not differentiate between SBEs and MBEs. In both cases the system will reset and map out the defective row, upon detection.

Combining the memory errors encountered in the first row test with base memory test leads to several possible cases. Some failing cases are described below.

Case 1

The system is populated with more than one row of memory and the first row memory test encounters a SBE (Single Bit Error). In this case, the BIOS will write these rows into CMOS history and map out the first row of DIMMs and continues with base memory testing. If the base memory test does not encounter any memory errors, then the system will continue to boot.

User Notification

The first row that contains the defective DIMM will be mapped out and the system will continue to boot with the remaining memory. An error message will be displayed to video for the mapped out defect DIMM.

```
"First row test"    - displayed on the upper LCD line during first row test
"0064MB"            - displayed on the lower LCD line during first row test

"Base memory test" - displayed on the upper LCD line and sometimes this message can go
                     by very fast
```

Later an error message for the defective DIMM will be displayed on the video as follows:

```
8C9X: "DIMMS mapped out: Upper Board, n-n+3".
```

Where ‘n’ refers to the DIMM number.

Example: Consider a system that is populated with two rows of 256 MB DIMMS in the upper board rows 1-4 and 5-8. If a single bit memory error was detected in DIMM 5 during the first row memory test and if no errors were found during the base memory test, the following message will appear on the video during POST:

```
2048 MB Total Memory Installed
1024 MB Configured
1024 MB Tested
```

The first line is the total memory installed (regardless of condition). The second line is the total memory useable (and is less than the first line, only if defective DIMMS were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line.

The following error message for the defective DIMM 5 will be displayed on the video as follows:

```
“8C95: DIMMs mapped out: Lower Board, 5 - 8”
```

User Action

If the user is satisfied with the configured memory on the system, no action is required. Otherwise, follow these steps:

1. Determine the location of the row of defective DIMMs from the error message or by running the EFI based SELViewer Utility or by running either the Intel Server Control (ISC) or Direct Platform Control (DPC) to read the System Event Log (SEL). Replace the defective DIMMs (in the example it is 5-8). On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous bad DIMM history.
3. Power on the system to continue.

Error Logging

The defective row/DIMM(s) found during this test case will be logged to the SEL and reported on the screen.

Case 2

The system is populated with more than one row of memory and the first row memory test encounters a SBE (Single Bit Error). The base row test encounters memory errors on all the rows. In this case, the BIOS will write the failing row from first row test into CMOS history, map out the first row of DIMMs, and continues with base memory testing. The base memory test will write the failing rows into CMOS history and map out the defective rows upon reset. If all the memory in base memory (< 2 GB) is mapped out due to memory errors, then the system will display a message on the LCD and halt the system.

User Notification

This memory test occurs during POST and prior to video sync. Therefore, any error found during this test will result in the following message displayed on the LCD panel and the system will halt.

```
"First row test"    - displayed on the upper LCD line
"0064 MB"           - displayed on the lower LCD line

"BASE MEMORY TEST"  - displayed on the upper LCD line
"ERRORS IN MEMORY"  - displayed on the upper LCD line
"RESETTING SYSTEM"  - displayed on the lower LCD line (prior to resetting if an error was
                      found)
```

Upon reset, you will see the following messages on the LCD:

```
"First row test"    - displayed on the upper LCD line
"0064 MB"           - displayed on the lower LCD line

"ALL DIMM MAP OUT"  - displayed on the upper LCD line
```

Example: Consider a system is populated with two rows of 256 MB DIMMS in the upper board row 1-4 and row 5-8. If an SBE was detected in DIMM 5 during the first row test and an SBE\MBE was detected in DIMM 1 during the base memory test, then the following message will appear on the LCD:

```
"First row test"
"0064 MB"

"BASE MEMORY TEST"
"ERRORS IN MEMORY"
"RESETTING SYSTEM"
```

Upon reset, you will see the following messages on the LCD and the system will halt:

```
"First row test"
"0064 MB"

"ALL DIMM MAP OUT"
```

User Action

1. Determine the first row of DIMMs using the scanning order defined in Table 11-2. Replace the first row of DIMMs with known good DIMMs. On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system.

NOTE: The defective rows of DIMM found during base memory test can be determined once the system boots from the "DIMMs mapped out" message. Then, those DIMMs can be replaced, if needed.

Error Logging

The defective row/DIMM(s) found during the base memory test will be logged to the SEL. This includes both single-bit errors (SBE) and multi-bit errors (MBE).

Case 3

The system is populated with more than one row of memory, the first row memory test encounters a SBE (Single Bit Error), and the base row test encounters memory errors but not on all the rows. In this case, the BIOS will write the failing row from first row test into CMOS history, map out the first row of DIMMs, and continues with base memory testing. The base memory testing will write the failing rows into CMOS and map out the defective rows upon reset. Since not all the memory in base memory test (< 2 GB) gets mapped out, then the system will continue to boot with the remaining good memory found during the base memory test.

User Notification

The defective rows found during first row test and base memory test will be mapped out and the system will continue to boot with the remaining base memory. An error message will be displayed to video for the mapped out defect DIMM.

Example: Consider a system that is populated with three rows of 256 MB DIMMS in the upper board rows 1-4, row 5-8, and row 9-12. If a memory error was detected in DIMM 5 during the first row memory test and a memory error was encountered in DIMM 1 during base test, the following messages will appear on the LCD:

```
"First row test"     - displayed on the upper LCD line
"0064 MB"            - displayed on the lower LCD line

"BASE MEMORY TEST"   - displayed on the upper LCD line
"ERRORS IN MEMORY"   - displayed on the upper LCD line
"RESETTING SYSTEM"   - displayed on the lower LCD line (prior to resetting if an error was
                       found)
```

Upon reset, you will see the following messages on the LCD:

```
"First row test"    - displayed on the upper LCD line
"0064 MB"           - displayed on the lower LCD line

"BASE MEMORY TEST" - displayed on the upper LCD line
```

The system will continue to boot and the following messages will appear on the screen during POST:

```
3072 MB Total Memory Installed
1024 MB Configured
1024 MB Tested
```

The first line is the total memory installed (regardless of condition). The second line is the total memory useable (and is less than the first line, only if defective DIMMS were found). The third line counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line.

```
8C99: DIMMs mapped out: Upper Board, 1 - 4
8C9D: DIMMs mapped out: Upper Board, 5 - 8
```

User Action

If the user is satisfied with the configured memory on the system, no action is required. Otherwise, follow these steps:

1. Determine the location of the row of defective DIMMs from the error message or by running the EFI based SELViewer Utility or by running either the Intel Server Control (ISC) or Direct Platform Control (DPC) to read the System Event Log (SEL). Replace the defective DIMMs

(in the example it is 5-8). On replacing the DIMMs, make sure the size and HP part number match.

2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system to continue.

Error Logging

The defective row/DIMM(s) found during this test case will be logged to the SEL and reported on the screen.

Case 4

This is a special case where memory errors encountered in the first row test and base memory test can lead to an infinite loop of system resets. This special case occurs under the following conditions:

1. First row test encounters an SBE, base memory test encounters memory errors and the jumper is set to 'clear CMOS' position
2. First row test encounters an SBE, base memory test encounters memory errors and a front panel button combination to clear CMOS has been completed.

   OR

3. First row test encounters an SBE, base memory test encounters memory errors and a bad CMOS checksum was seen by BIOS.

User Notification

The BIOS will try to map out defective rows found during base memory test but will end up in an infinite reset loop.

```
"First row test"    - displayed on the upper LCD line
"0064 MB"           - displayed on the lower LCD line

"BASE MEMORY TEST"  - displayed on the upper LCD line
"ERRORS IN MEMORY"  - displayed on the upper LCD line
"RESETTING SYSTEM"  - displayed on the lower LCD line (prior to resetting)
```

Upon reset, the above messages will display again on the LCD and will keep repeating in an infinite loop.

User Action

1. Use the out-of-band mechanism of reading System Event Log (Intel's Server Management software, specifically DPC, can be used for this) to determine the location of the row of defective DIMMs from the SELViewer Utility or by running either the Intel Server Control (ISC) or Direct Platform Control (DPC) to read the System Event Log (SEL). Replace the defective DIMMs (in the example it is 5-8). On replacing the DIMMs, make sure the size and HP part number match.
2. Clear CMOS via the front panel or via clear CMOS jumper in order to clear previous defective DIMM history.
3. Power on the system to continue.

Error Logging

The defective row/DIMM(s) found during this test case will be logged to the SEL and reported on screen.

Extended Memory Test

The extended memory test takes effect after both the first row test and the base memory test have passed. The Extended Memory Test will test the physical memory above 2 GB to a maximum of the total installed memory. Any errors found will be detected to the failing memory row and recorded into the CMOS history bits for processing during the next reset. Since this occurs after system POST, the BIOS will not reset the system. Instead, error messages will be displayed on the video screen.

There is a 2 GB fixed gap between the memory address 2 GB to 4 GB that is reserved for PCI. This 2 GB of memory addresses, as seen by the processor, will not be tested.

User Notification

There are two sets of messages associated with this test. The first occurs when the test is being performed. The message is as follows:

```
XXXXX MB Total Memory Installed
XXXXX MB Configured
XXXXX MB Tested

Memory Errors Detected (will appear only if extended memory test
finds errors).
```

The first line is the total memory installed (regardless of condition). The second line is the total memory useable (and is less than the first line, only if defective DIMMS were found). The third line

counts the memory as the test is being performed. When the test is completed, the number in this line should equal the number in the second line. A fourth line, "Memory Errors Detected", will occur only if the memory test found errors on this latest test pass. It will not occur if the memory test found errors on previous boots; however, in that case, the size in the second line will be smaller than the first line.

NOTE: There is a 2 GB fixed gap between the memory address 2 GB to 4 GB, which is occupied by PCI gap, system flash address, and other fixed addresses. This 2 GB of memory address space will not be available for 'Configured' memory. For example, if a system has total installed memory of 64 GB, the maximum useable memory in the system will be (64 GB – 2 GB) = 62 GB. In this case, the "Configured" line will read 62 GB. As mentiioned above, the "Tested" line will count up and its final value will always be equal to the "Configured" line (assuming all the memory is good, this will be 62 GB in this example).

A second set of messages will be seen later in the POST, which indicates where the memory test found errors. The sequence is as follows:

```
Error in memory subsystem: (Lower/Upper) Board, DIMM XX

ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED OUT
ON THE NEXT RESET. IT IS STRONGLY SUGGESTED THAT YOU RESET THE
SYSTEM NOW.

ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN UNSTABLE
SYSTEM BEHAVIOR AND/OR HARD DISK CORRUPTION.

Hit <F1> to load defaults or <F2> to run SETUP or <ESC> to continue
```

Examples

The following examples assume that the total memory installed is 32 GB (32768 MB).

Example #1

The system boots with 32 GB of memory installed and, no defects found, will report the following:

```
32768 MB Total Memory Installed
32768 MB Configured
32768 MB Tested
```

Example #2

Consider a system populated that has the entire upper board memory slots with 1 GB DIMMs. The first row test and the base row test passed without errors. The extended memory test detected a memory error in DIMM 17. The following messages will appear:

```
32768 MB Total Memory Installed
32768 MB Configured
32768 MB Tested
Memory Errors Detected
```

A second set of messages will be seen later in the POST that indicates where the memory test found errors. The sequence is as follows:

```
8C81: Error in memory subsystem: Upper Board, DIMM 17

8C82: ERRORS FOUND IN MEMORY SUBSYSTEM. FAILING ROWS WILL BE MAPPED
OUT ON THE NEXT RESET. IT IS STRONGLY SUGGESTED THAT YOU RESET THE
SYSTEM NOW.ALLOWING THE SYSTEM TO CONTINUE TO BOOT MAY RESULT IN
UNSTABLE SYSTEM BEHAVIOR AND/OR HARD DISK CORRUPTION.

Hit <F1> to load defaults or <F2> to run SETUP or <ESC> to continue
```

The first line will be seen for each DIMM that on which the extended memory test has found an error. This message will NOT be seen on subsequent POSTs.

The second and the third line will be seen each time a memory error was found by the extended memory test.

User Action

Upon getting the notification of memory errors during extended memory testing, HP strongly recommends that the server be reset by pressing the reset button. On the subsequent boot, the defective DIMMs, found during extended memory testing, will be mapped out and will not be available as part of the useable memory. Failure to do the reset would result in an unstable behavior of the system.

Under 'User Notification' in Example #2, the following error message can be seen if the system is reset.

```
32768 MB Total Memory Installed
30720 MB Configured
30720 MB Tested

8C9B: DIMMs mapped out: Upper Board, 17-20
```

NOTE: On the above example, we do NOT see "Memory Errors Detected", because the defective memory has been mapped out. This is shown because the second line configured size is less than the first.

Error Logging

For the extended memory test, four error records will be written for multi-bit errors, one for each DIMM. For single-bit-errors during the extended memory test, error records will be one per DIMM. By specifications, the DIMM number will be one less than the silk-screened number on the printed-circuit board. Please refer to *Error Log Format Specification Version 0.7* for details on the format of the error records.

Memory Test Duration

The time it takes for memory test depends on the size of memory and the exact population scheme. The more memory that is tested, the longer this test takes, with a full test taking a significant amount of time. To alleviate this problem, skipping memory locations can be done, but this does not exercise the entire memory subsystem. To reach a compromise, there will be CMOS Setup options available to the user. These CMOS options will allow a user to select a quick memory test or an exhaustive one. Refer to the section on "Setup Dialog" section below for more information on the options.

Aborting the Memory Test

Users are given the option to abort the memory test by pressing the spacebar. The following string will appear on the bottom of the screen when executing the extended memory test:

```
Press spacebar to abort memory test.
```

However, this method will only work for the extended memory test, but not for the first row or base memory tests. The total amount of memory installed in the system will still be reported on the video screen.

Setup Dialog

The BIOS setup (F2) menu has the following selections:

->Advanced->Chipset Configuration->Memory Related Items:

Table 11-3. Memory Test Setup Items

Name	Selection	Comments
System ECC	Enabled	Default
	Disabled	
First Row Test Interval	4 cache line per 16 MB	Default
	Every location	
Base Memory Test Interval	4 cache line per 16 MB	Default
	Every location	
Extended Memory Test Interval	4 cache line per 16 MB	Default
	Every location	
Defective DIMM Mapout	Enabled	Default - Enables map out
	Disabled	Disables map out – NOT RECOMMENDED
Clear Bad Memory Row Info	Disabled	Default - Don't clear history
	Enabled	Clear history

The test interval entries determine how much of the target memory is tested. The default in all cases is 4 cache line per 16 MB (fastest mode). In the alternate mode, each cache line is tested.

The 'Defective DIMM Mapout' is used to turn off mapout completely. If this is disabled, defective DIMMs will be detected, but not mapped out on the next BOOT. This may lead to data corruption and loss and HP DOES NOT RECOMMEND that this feature be disabled in the BIOS.

The 'Clear Bad Memory Row Info' is used to clear the history, and retest all memory. This option is used when defective memory has been replaced, and the user wishes to place it in service again. This option automatically goes back to 'disabled' after the next boot.

Memory Testing Error Codes\Messages

8C51: Error in memory subsystem: Lower Board, DIMM 1

8C52: Error in memory subsystem: Lower Board, DIMM 2

8C53: Error in memory subsystem: Lower Board, DIMM 3

8C54: Error in memory subsystem: Lower Board, DIMM 4

8C55: Error in memory subsystem: Lower Board, DIMM 5

8C56: Error in memory subsystem: Lower Board, DIMM 6

8C57: Error in memory subsystem: Lower Board, DIMM 7

8C58: Error in memory subsystem: Lower Board, DIMM 8

8C59: Error in memory subsystem: Lower Board, DIMM 9
8C5A: Error in memory subsystem: Lower Board, DIMM 10
8C5B: Error in memory subsystem: Lower Board, DIMM 11
8C5C: Error in memory subsystem: Lower Board, DIMM 12
8C5D: Error in memory subsystem: Lower Board, DIMM 13
8C5E: Error in memory subsystem: Lower Board, DIMM 14
8C5F: Error in memory subsystem: Lower Board, DIMM 15
8C60: Error in memory subsystem: Lower Board, DIMM 16
8C61: Error in memory subsystem: Lower Board, DIMM 17
8C62: Error in memory subsystem: Lower Board, DIMM 18
8C63: Error in memory subsystem: Lower Board, DIMM 19
8C64: Error in memory subsystem: Lower Board, DIMM 20
8C65: Error in memory subsystem: Lower Board, DIMM 21
8C66: Error in memory subsystem: Lower Board, DIMM 22
8C67: Error in memory subsystem: Lower Board, DIMM 23
8C68: Error in memory subsystem: Lower Board, DIMM 24
8C69: Error in memory subsystem: Lower Board, DIMM 25
8C6A: Error in memory subsystem: Lower Board, DIMM 26
8C6B: Error in memory subsystem: Lower Board, DIMM 27
8C6C: Error in memory subsystem: Lower Board, DIMM 28
8C6D: Error in memory subsystem: Lower Board, DIMM 29
8C6E: Error in memory subsystem: Lower Board, DIMM 30
8C6F: Error in memory subsystem: Lower Board, DIMM 31
8C70: Error in memory subsystem: Lower Board, DIMM 32
8C71: Error in memory subsystem: Upper Board, DIMM 1
8C72: Error in memory subsystem: Upper Board, DIMM 2
8C73: Error in memory subsystem: Upper Board, DIMM 3
8C74: Error in memory subsystem: Upper Board, DIMM 4
8C75: Error in memory subsystem: Upper Board, DIMM 5
8C76: Error in memory subsystem: Upper Board, DIMM 6
8C77: Error in memory subsystem: Upper Board, DIMM 7
8C78: Error in memory subsystem: Upper Board, DIMM 8
8C79: Error in memory subsystem: Upper Board, DIMM 9
8C7A: Error in memory subsystem: Upper Board, DIMM 10

8C7B: Error in memory subsystem: Upper Board, DIMM 11
8C7C: Error in memory subsystem: Upper Board, DIMM 12
8C7D: Error in memory subsystem: Upper Board, DIMM 13
8C7E: Error in memory subsystem: Upper Board, DIMM 14
8C7F: Error in memory subsystem: Upper Board, DIMM 15
8C80: Error in memory subsystem: Upper Board, DIMM 16
8C81: Error in memory subsystem: Upper Board, DIMM 17
8C82: Error in memory subsystem: Upper Board, DIMM 18
8C83: Error in memory subsystem: Upper Board, DIMM 19
8C84: Error in memory subsystem: Upper Board, DIMM 20
8C85: Error in memory subsystem: Upper Board, DIMM 21
8C86: Error in memory subsystem: Upper Board, DIMM 22
8C87: Error in memory subsystem: Upper Board, DIMM 23
8C88: Error in memory subsystem: Upper Board, DIMM 24
8C89: Error in memory subsystem: Upper Board, DIMM 25
8C8A: Error in memory subsystem: Upper Board, DIMM 26
8C8B: Error in memory subsystem: Upper Board, DIMM 27
8C8C: Error in memory subsystem: Upper Board, DIMM 28
8C8D: Error in memory subsystem: Upper Board, DIMM 29
8C8E: Error in memory subsystem: Upper Board, DIMM 30
8C8F: Error in memory subsystem: Upper Board, DIMM 31
8C90: Error in memory subsystem: Upper Board, DIMM 32
8C91: DIMMs mapped out: Lower Board, 1 - 4
8C92: DIMMs mapped out: Lower Board, 9 - 12
8C93: DIMMs mapped out: Lower Board, 17 - 20
8C94: DIMMs mapped out: Lower Board, 25 - 28
8C95: DIMMs mapped out: Lower Board, 5 - 8
8C96: DIMMs mapped out: Lower Board, 13 - 16
8C97: DIMMs mapped out: Lower Board, 21 - 24
8C98: DIMMs mapped out: Lower Board, 29 - 32
8C99: DIMMs mapped out: Upper Board, 1 - 4
8C9A: DIMMs mapped out: Upper Board, 9 - 12
8C9B: DIMMs mapped out: Upper Board, 17 - 20
8C9C: DIMMs mapped out: Upper Board, 25 - 28

8C9D: DIMMs mapped out: Upper Board, 5 - 8

8C9E: DIMMs mapped out: Upper Board, 13 - 16

8C9F: DIMMs mapped out: Upper Board, 21 - 24

8CA0: DIMMs mapped out: Upper Board, 29 – 32

DIMMUTIL

Dimmutil will map out DIMMS that are installed in the hp server rx4610. The program will identify the DIMM location (slot number), DIMM size, DIMM manufacturer, and DIMM revision.

Usage:

>dimmutil.efi -b

Output Example:

Location: A8

Size: 128MB

Manufacturer: MT18LSDT1672G-10EC2

Revision: 2.0

12 Parts Information

Exploded View – Hot Swap and Display

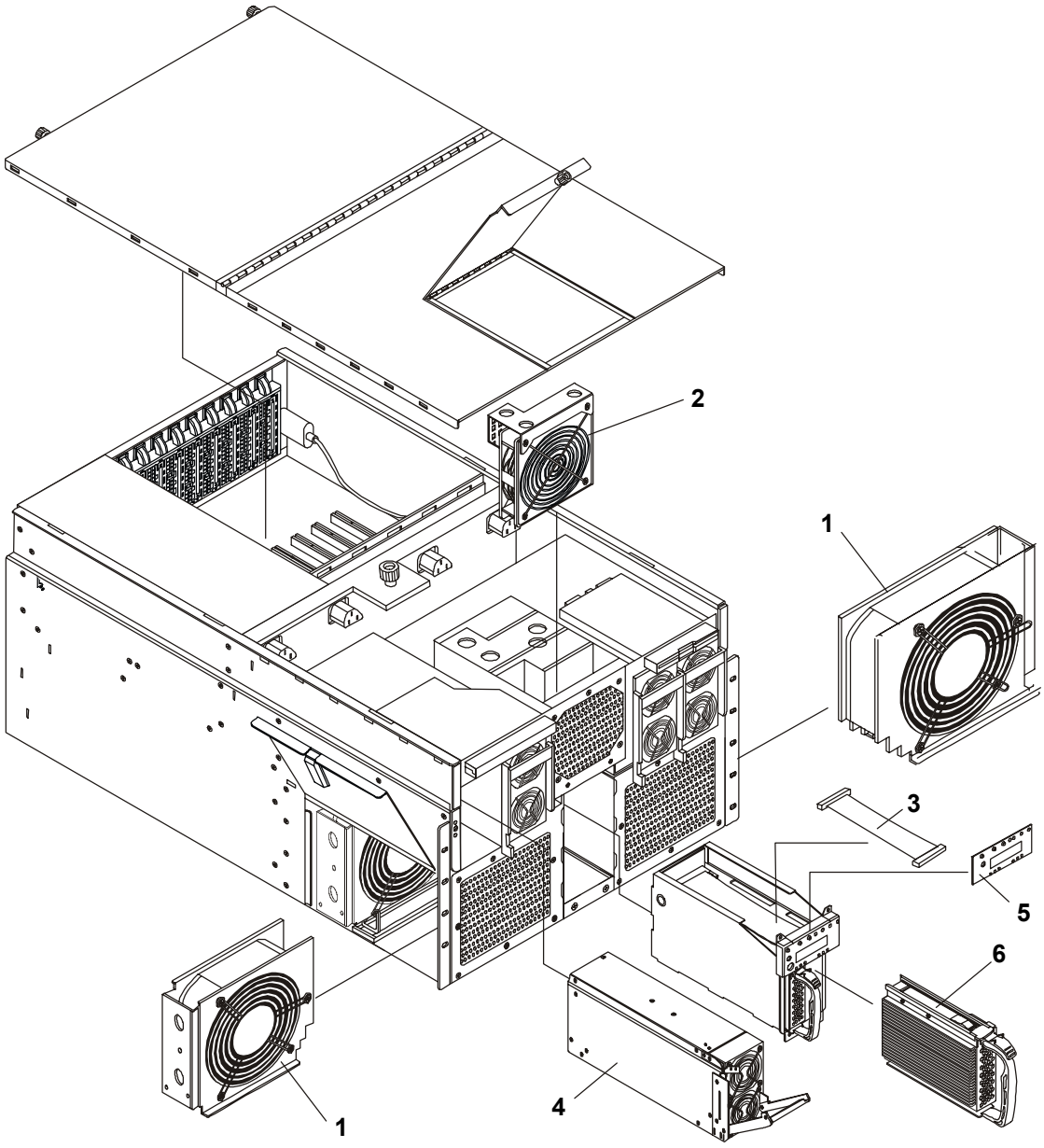


Figure 14. Hot Swap Components

Exploded View – Processor/Memory Access

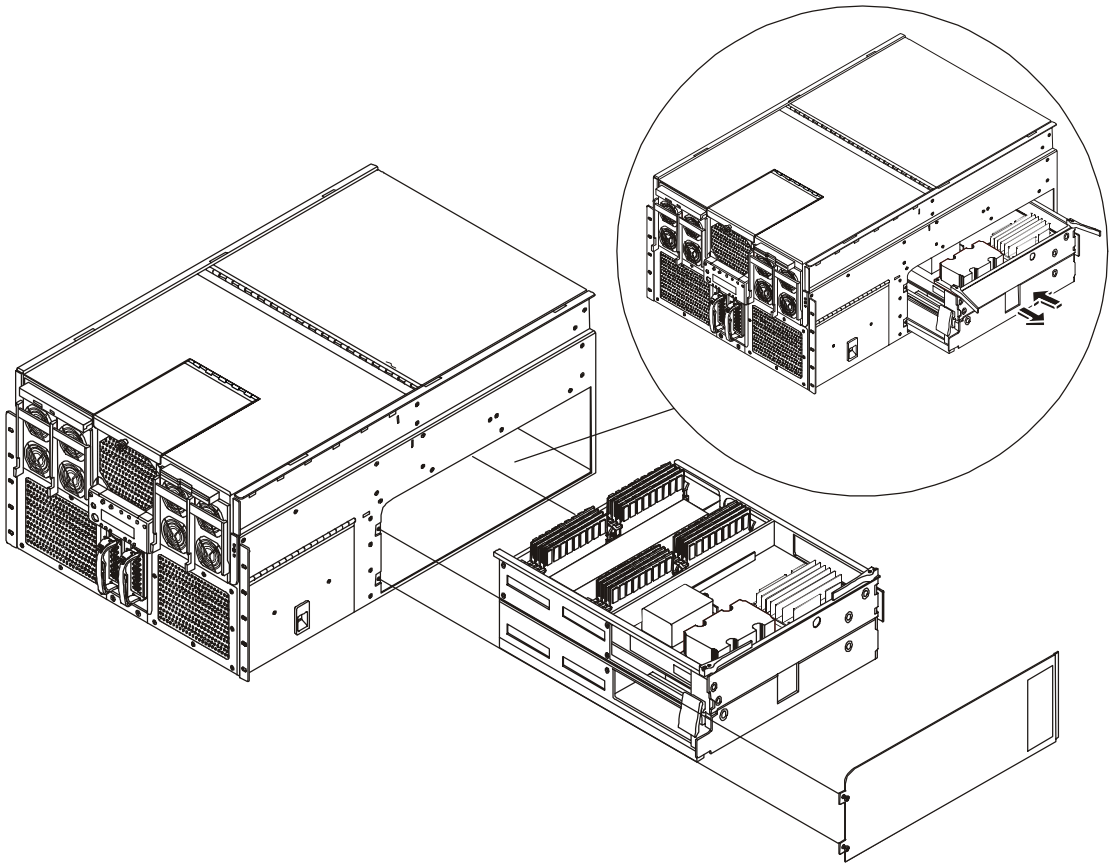


Figure 15. Processor/Memory Complex Access

Exploded View – Processor/Memory Complex

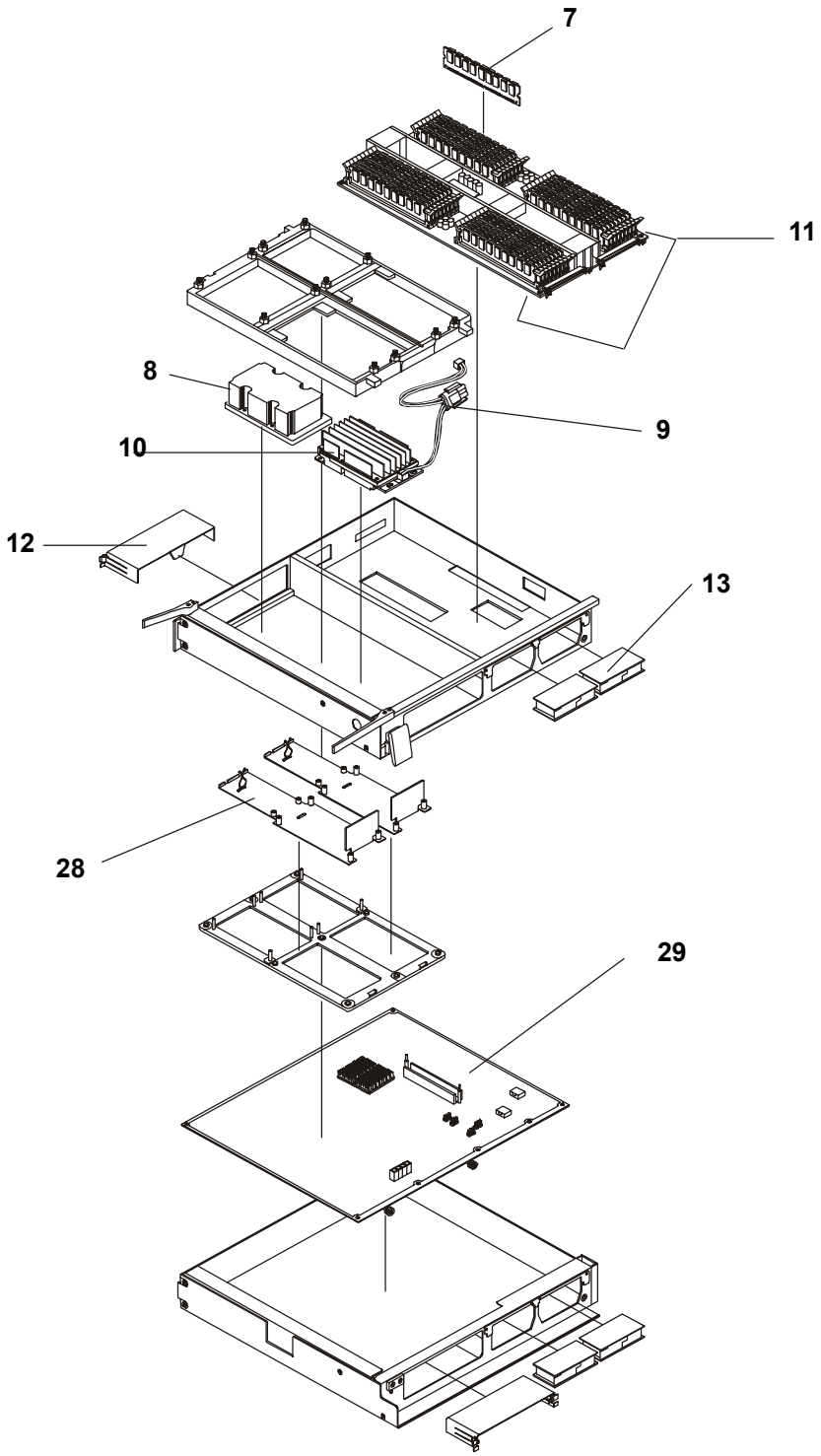


Figure 16. Processor/Memory Complex

Exploded View – Server Management Boards

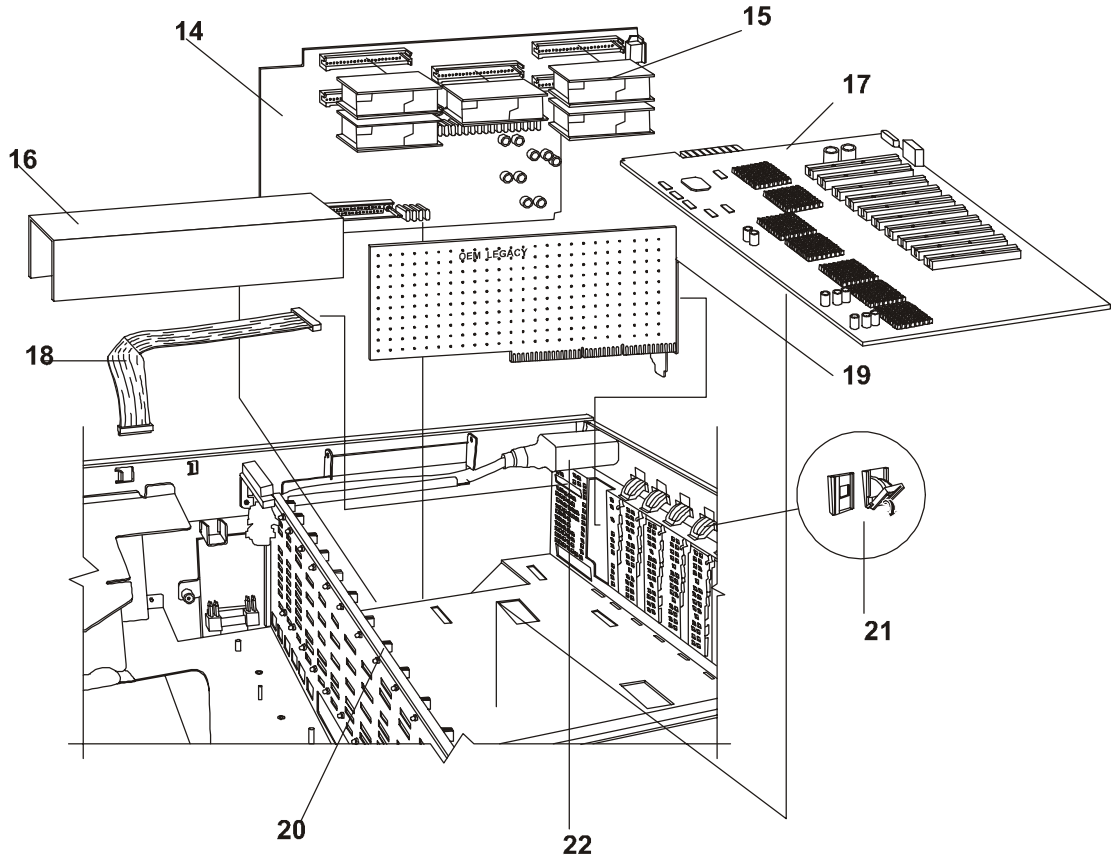


Figure 17. Server Management Boards – Exploded View

Exploded View – Power Distribution Board and IDE Drives

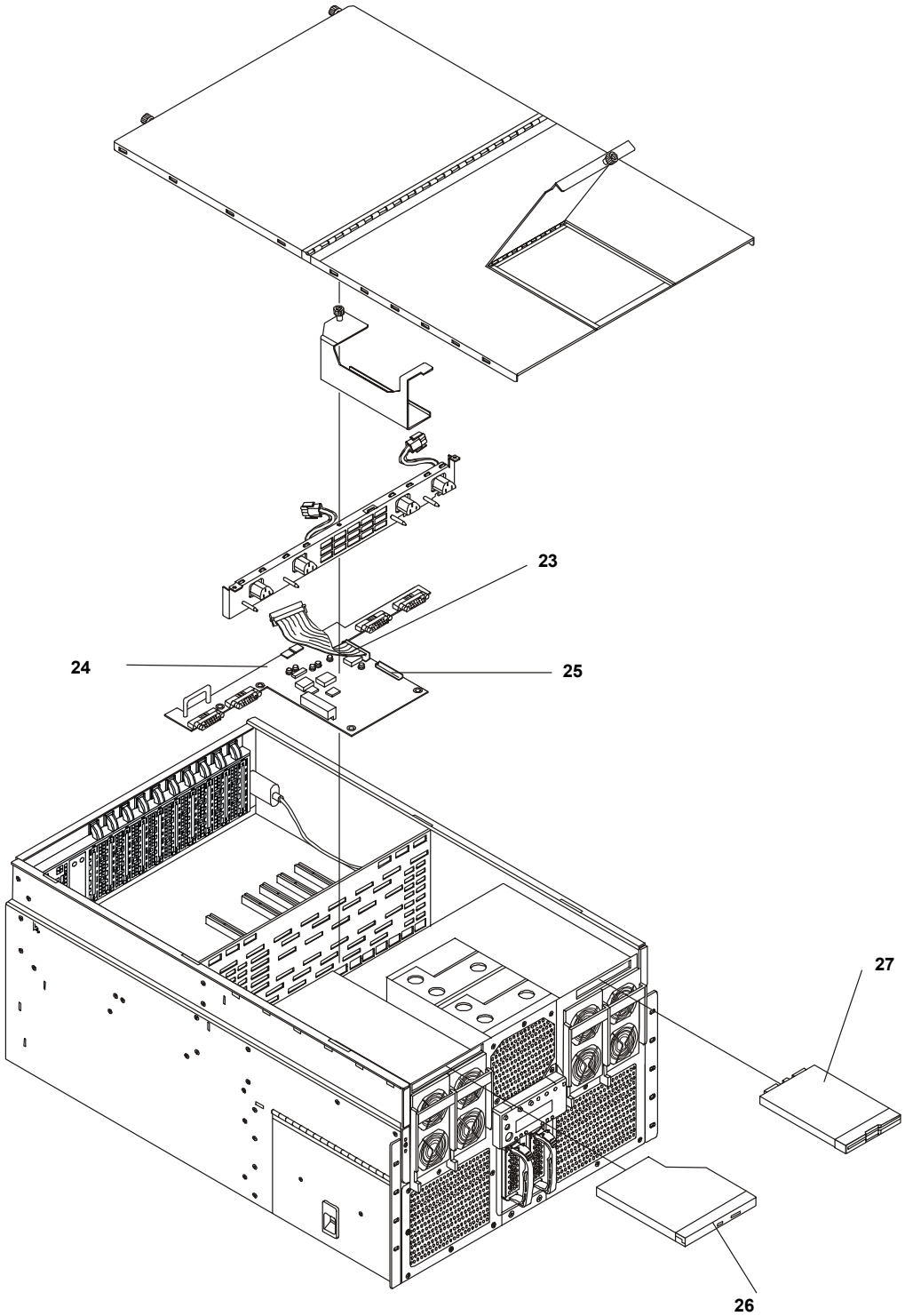


Figure 18. T-Docking Board and IDE Drives

Replaceable Parts List

The items in this list and the corresponding item numbers in the respective Exploded Views apply to the HP Server, except where noted.

NOTE The item numbers listed below are used with the part illustrations in order to identify the nomenclature of the part. If a system board needs to be replaced, remove processor modules, DIMMs, or adapter boards and transfer these to the new board. Ensure all jumper and switch settings on the old board are transferred to the new board.

* This part is not on an exploded view

Parts List Identifier

Figure 14. Hot Swap Components

Item No.	Part Description	Part Number
1	172 mm Fan Assy	A6153-67032
2	120 mm Fan Assy	A6153-67033
3	Front Panel Cable	A6153-67020
4	Power Supply	A6153-67031
5	Front Panel Board	A6153-67007
6	HDD Assy	A6171-67001
*	SCSI Backplane Board (HSBP)	A6153-67004
*	172mm Fan Cable	A6153-67017
*	120mm Fan Cable	A6153-67018
*	HDD	N.A.
*	Power Supply Filler Panel	N.A.
*	172mm Fan Cable Bracket	N.A.
*	Front Bezel	A6153-67052

Figure 16. Processor/Memory Complex		
Item No.	**Part Description**	**Part Number**
7	256MB DIMM 512MB DIMM 1GB DIMM	A6168-67001 A6169-67001 A6170-67001
8	733MHz/2MB CPU Assy 800MHz/4MB CPU Assy	A6165-67001 A6448-67001
9	Y-Cable	A6153-67012
10	CPU Power Pod	A6165-67040
11	Memory Board	A6153-67002
12	Thermal Sheetmetal Kit (includes D2D cover, CPU Airflow Baffle, Power Supply Filler Panel)	A6153-67053
13	3.3V D2D	A6153-67027
28	CPU Thermal Dummy	A6153-67045
29	CPU Board	A6153-67001
Figure 17. Server Management Boards		
Item No.	**Part Description**	**Part Number**
14	Sideplane Board	A6153-67008
15	5V D2D	A6153-67036
16	Thermal Sheetmetal Kit (includes D2D cover, CPU Airflow Baffle, Power Supply Filler Panel)	A6153-67053
17	I/O Baseboard	A6153-67010
18	External SCSI Cable	A6153-67021
19	Legacy I/O Board	A6153-67009
20	I/O Card Guide	A6153-67042
21	Rocker Switch	A6153-67041
22	RH AC Inlet Cable	A6153-67024
*	LH AC Inlet Cable	A6153-67023
*	Internal Power Cable	A6153-67019
*	I/O Baseboard Cover	A6153-67043
*	I/O Card Divider	A6153-67044

Figure 18. Power Distribution Board and IDE Drives		
Item No.	**Part Description**	**Part Number**
23	Internal SCSI Cable	A6153-67015
24	Power Dist. Board (T-Dock)	A6153-67006
25	Server Mgmt Cable	A6153-67016
26	DVD Assy	A6153-67030
27	LS-120 Assy	A6153-67029
*	12V D2D	A6153-67028
*	LS-120 Connector Board	A6153-67003
*	DVD Connector Board	A6153-67005
*	Hot Plug PCI Board	A6153-67011
*	DVD Cable	A6153-67013
*	LS-120 Cable	A6153-67014
*	HPI Cables	A6153-67022
Racking		
Item No.	**Part Description**	**Part Number**
*	Rack Kit (Rail Kit)	A6153-67047
*	Front Bezel	A6153-67052
*	Side Handles Kit	A6153-67054
*	Front Handles Kit	A6153-67055
Other Cables		
Item No.	**Part Description**	**Part Number**
*	Power Cords	A6153-67025

Appendix A Specifications

Introduction

This appendix provides the power requirements, operating conditions (environmental requirements), physical requirements, hardware specifications, and video resolutions of the HP Server. The system board layout is provided in
Figure A-1.

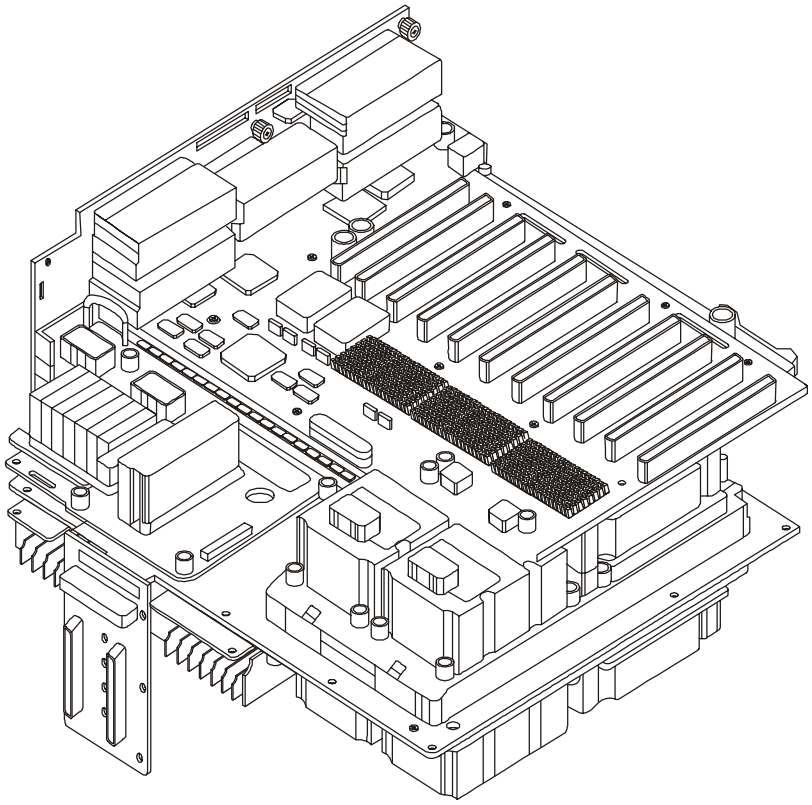


Figure A-1. System Board Layout

Requirements

The following tables provide the specifications required for normal operation of the HP Server.

Table A-1. Power Supply Specifications

Parameter	Characteristics
Input Power	208/110 VAC
Input Range – Maximum	Dual rating: 800W minimum over 180-264 VAC 700W minimum over 90-132 VAC
Operating Current	100 VAC 5.3 A

	120 VAC 4.6 A 200/208 VAC 3.2 A 220/230 VAC 2.8 A
In-rush Current	25 A
Output Voltages	+48 V +12 V standby
Operating Power	256 W Continuous

Table A-2. Environmental Requirements

Parameter	Conditions
Temperature	
Operating	5 °C to 35 °C (41 °F to 95 °F).
Non-operating	
Humidity	
Operating	20% to 80% relative humidity, non-condensing
Non-operating	5% to 95% relative humidity, non-condensing
Altitude	
Operating	-30 to 3,000 m (~ 10,000 ft)
Non-operating	-30 to 12,000 m (~ 40,000 ft)
Thermal Output	
Maximum Operating	1007 BTU/hr

Table A-3. Weight and Dimensions

Weight	Approx. 150 lbs (68.1 kg.), depending on configuration – excludes keyboard and monitor.
Height	31.12 cm (12.25 inches, 7U)
Width	44.45 cm (17.5 inches)
Depth	71.12 cm (28.0 inches)
Required front clearance	7.62 cm (3 inches)
Required rear clearance	20.32cm (8 inches)
Heat Dissipation	6174 BTU/hr

Table A-4. HP Server Hardware Specifications

Processors	Up to four 733 MHz/2 MB or up to four 800 MHz/ 4 MB Intel Itanium processors, packaged in Slot M pin array cartridges.
Chipset	QLogic chip set with 66/133 MHz bus speed support
Memory	Two plug-in boards containing main memory supporting PC100 Version 1.2 buffered SDRAM. DIMM sizes supported are 256 MB, 512 MB, and 1 GB. Each memory board supports from 1 GB to 32 GB of error correction code memory using 32 72-bit dual inline memory modules. The boards interface to the processors via connectors on each side of the processor board.
Video	ATI RAGE XL super video graphics array controller with 16 MB of video memory.
SCSI	The Qlogic ISP 12160 LVDS embedded dual channel controller supports the internal SCSI drives and is connected to the SCSI backplane; the second LVDS channel is routed to the rear of the server to support external devices.
IDE	Contained on the Legacy I/O Board, the two IDE buses support the diskette drive on Primary IDE 0 and the DVD drive on Secondary IDE 1.
PCI Bus	Eight 64-bit/66 MHz Hot Plug PCI I/O expansion slots.
	Two 64-bit/33 MHz PCI expansions slots.
I/O	Two Serial ports and one bi-directional parallel port with ECP/EPP high-speed support. PS/2 style mouse and keyboard connectors.
DVD	Bundled DVD drive with an IDE interface.

Video Display Modes

The ATI RAGE XL integrated video controller provides VGA modes for resolutions of 1280 x 1024 and below. Areas of the table that appear in gray are unsupported.

Table A-5. 2D Modes for 64-bit SDR SD/SGRAM (100 MHz)

Display Mode	Refresh Rate Hz	4				8				16				32			
		8	16	24	32	8	16	24	32	8	16	24	32	8	16	24	32
640 x 480	60 - 200																
800 x 600	48 - 180																
1024 x 768	43 - 140																
1152 x 864	43 - 100																
1280 x 1024	43																
	47																
	60																
	70																
	74																
	75																
	85																
	90																
	100																

Connector Pinouts and Boardset Locations

VGA Video Port

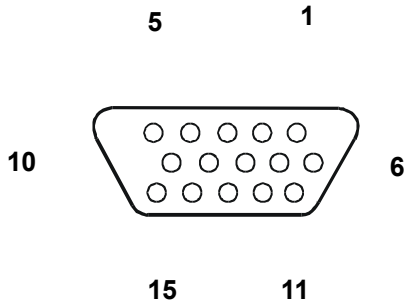


Figure A-2. Video Port Connector Pinout

Table A-6.Video Port Connector Pinout

Pin	Signal	Pin	Signal
1	Red	9	N/C
2	Green	10	GND
3	Blue	11	NC
4	N/C	12	DDCDAT
5	GND	13	HSYNC
6	GND	14	VSYNC

Pin	Signal	Pin	Signal
7	GND	15	DDCCLK
8	GND		

Keyboard and Mouse

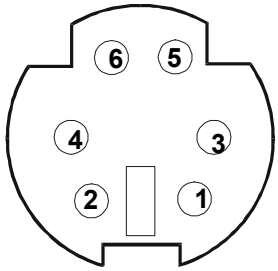


Figure A-3. Keyboard and Mouse Connectors

The PS/2-compatible connectors share a common housing; but they are not functionally equivalent.

Table A-7.Keyboard and Mouse Connector Pinouts

Pin	Keyboard signal	Pin	Mouse signal
1	KEYDAT	1	MSEDAT
2	NC	2	NC
3	GND	3	GND
4	FUSED_VCC (+5 V)	4	FUSED_VCC (+5 V)
5	KEYCLK	5	MSECLK
6	NC	6	NC

Parallel Port

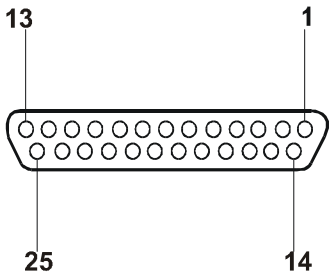


Figure A-4. Parallel Port Connector Pinout

Table A-8.Parallel Port Connector Pinout

Pin	Signal	Pin	Signal
1	STROBE_L	10	ACK_L
2	Data bit 0	11	Busy
3	Data bit 1	12	PE
4	Data bit 2	13	SLCT
5	Data bit 3	14	AUFDXT_L
6	Data bit 4	15	ERROR_L
7	Data bit 5	16	INIT_L
8	Data bit 6	17	SLCTIN_L
9	Data bit 7	18–25	GND

Serial Ports A and B

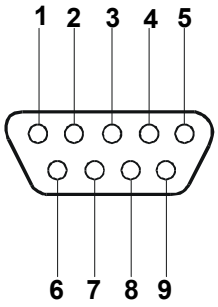


Figure A-5. Serial Ports A and B

Table A-9.Serial Port Connector Pinout

Pin	Signal	Description
1	DCD	Data carrier detected
2	RXD	Receive data
3	TXD	Transmit data
4	DTR	Data terminal ready
5	GND	Ground

Pin	Signal	Description
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RIA	Ring indication active

Universal Serial Bus (USB)

There are two external USB connectors designated A and B at the back panel.

Figure A-6. USB Connectors

Table A-10. USB Connector Pinout

Pin	Signal	Notes
A1	VCC	Over current monitor line port 0
A2	DataL0	Differential data line paired with DATAH0
A3	DataH0	Differential data line paired with DATAL0
A4	GND	Cable ground
B1	VCC	Over current monitor line port 1
B2	DATAL1	Differential data line paired with DATAH1
B3	DATAH1	Differential data line paired with DATAl1
B4	GND	Cable ground

SCSI

There is one external SCSI connector on the back of the server.

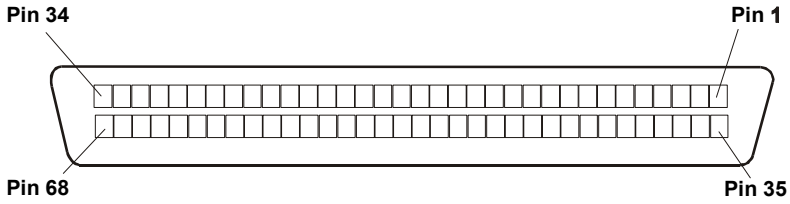


Figure A-7. SCSI Connector

Table A-11. Wide SCSI Connector Pinout

Pin	Signal	Pin	Signal
1	S1 (+DB 12)	35	S35 (-DB 12)
2	S2 (-DB 13)	36	S36 (-DB 13)
3	S3 (+DB 14)	37	S37 (-DB 14)
4	S4 (+DB 15)	38	S38 (-DB 15)
5	S5 (+DB P1)	39	S39 (-DB P1)
6	S6 (+DB 0)	40	S40 (-DB 0)
7	S7 (+DB 1)	41	S41 (-DB 1)
8	S8 (+DB 2)	42	S42 (-DB 2)
9	S9 (DB 3)	43	S43 (-DB 3)
10	S10 (+DB 4)	44	S44 (-DB 4)
11	S11 (+DB5)	45	S45 (-DB 5)
12	S12 (+DB 6)	46	S46 (-DB 6)
13	S13 (+DB 7)	47	S47 (-DB 7)
14	S14 (+DB P)	48	S48 (-DB P)
15	S15	49	S49
16	S16 (DIFFSENS)	50	S50
17	S17 (TERMPWR)	51	S51 (TERMPWR)
18	S18 (TERMPWR)	52	S52 (TERMPWR)
19	S19 (RESERVED)	53	S53 (RESERVED)
20	S20	54	S54
21	S21 (+ATN)	55	S55 (-ATN)
22	S22 S22	56	S56
23	S23 (+BSY)	57	S57 (-BSY)
24	S24 (+ACK)	58	S58 (-ACK)
25	S25 (+RST)	59	S59 (-RST)
26	S26 (+MSG)	60	S60 (-MSG)
27	S27 (+SEL)	61	S61 (-SEL)
28	S28 (+C/D)	62	S62 (-C/D)

Pin	Signal	Pin	Signal
29	S29 (+REQ)	63	S63(-REQ)
30	S30 (+I/O)	64	S64 (-I/O)
31	S31 (+DB 8)	65	S65 (-DB 8)
32	S32 (+DB 9)	66	S66(-DB 9)
33	S33 (DB 10)	67	S67 (-DB 10)
34	S34 (DB 11)	68	S68 (-DB 11)

IDE

One IDE connection exists inside on the Legacy I/O Board. The cable connects to both the diskette drive and DVD. If no IDE drives are present, an IDE cable should not be connected. If only one IDE drive is installed, it must be connected at the end of the cable.

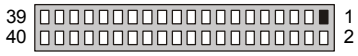


Figure A-8. IDE Connector

Table A-12. IDE Connector Pinout

Pin	Signal	Pin	Signal
1	RSTDRV	21	DRQ
2	GND	22	GND
3	DD7	23	DIOW
4	DD8	24	GND
5	DD6	25	DIOR
6	DD9	26	GND
7	DD5	27	IORDY
8	DD10	28	CSEL (1 KΩ p/d)
9	DD4	29	DACK
10	DD11	30	GND
11	DD3	31	IRQ
12	DD12	32	Reserved (N/C)
13	DD2	33	DA1
14	DD13	34	Reserved (N/C)
15	DD1	35	DA0
16	DD14	36	DA2
17	DD0	37	CS1P_L
18	DD15	38	DS3P_L
19	GND	39	DHACT_ L

Pin	Signal	Pin	Signal
20	Keyed	40	GND

PCI

PCI connectors exist inside the chassis on the I/O Baseboard.

Table A-13. 33MHz, 64-bit PCI Connectors (Slots 1 and 2)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST_L	A48	GND	B1	-12V	B48	AD10
A2	+12V	A49	AD9	B2	TCK	B49	M66EN
A3	TMS	A50	5V KEYWAY	B3	GND	B50	5V KEYWAY
A4	TDI	A51	5V KEYWAY	B4	TDO	B51	5V KEYWAY
A5	+5V	A52	C/BEO_L	B5	+5V	B52	AD8
A6	INTA_L	A53	+3.3V	B6	+5V	B53	AD7
A7	INTC_L	A54	AD6	B7	INTB_L	B54	+3.3V
A8	+5V	A55	AD4	B8	INTD_L	B55	AD5
A9	RESERVED	A56	GND	B9	PRSNT1_L	B56	AD3
A10	+5V	A57	AD2	B10	RESERVED	B57	GND
A11	RESERVED	A58	AD0	B11	PRSNT2_L	B58	AD1
A12	GND	A59	+5V	B12	GND	B59	+5V
A13	GND	A60	REQ64_L	B13	GND	B60	ACK64_L
A14	RESERVED	A61	+5V	B14	RESERVED	B61	+5V
A15	RESET_L	A62	+5V	B15	GND	B62	+5V
A16	+5V	A63	GND	B16	CLK	B63	RESERVED
A17	GRANT_L	A64	C/BE7_L	B17	GND	B64	GND
A18	GND	A65	C/BE5_L	B18	REQ_L	B65	C/BE6_L
A19	RESERVED	A66	+5V	B19	+5V	B66	C/BE4_L
A20	AD30	A67	PAR64	B20	AD31	B67	GND
A21	+3.3V	A68	AD62	B21	AD29	B68	AD63
A22	AD28	A69	GND	B22	GND	B69	AD61
A23	AD26	A70	AD60	B23	AD27	B70	+5V
A24	GND	A71	AD58	B24	AD25	B71	AD59
A25	AD24	A72	GND	B25	+3.3V	B72	AD57
A26	IDSEL	A73	AD56	B26	C/BE3_L	B73	GND
A27	+3.3V	A74	AD54	B27	AD23	B74	AD55
A28	AD22	A75	+5V	B28	GND	B75	AD53
A29	AD20	A76	AD52	B29	AD21	B76	GND
A30	GND	A77	AD50	B30	AD19	B77	AD51
A31	AD18	A78	GND	B31	+3.3V	B78	AD49
A32	AD16	A79	AD48	B32	AD17	B79	+5V
A33	+3.3V	A80	AD46	B33	C/BE2_L	B80	AD47

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A34	FRAME_L	A81	GND	B34	GND	B81	AD45
A35	GND	A82	AD44	B35	IRDY_L	B82	GND
A36	TRDY_L	A83	AD42	B36	+3.3V	B83	AD43
A37	GND	A84	+5V	B37	DEVSEL_L	B84	AD41
A38	STOP_L	A85	AD40	B38	GND	B85	+5V
A39	+3.3V	A86	AD38	B39	LOCK_L	B86	AD39
A40	SDONE	A87	GND	B40	PERR_L	B87	AD37
A41	SB0_L	A88	AD36	B41	+3.3V	B88	+5V
A42	GND	A89	AD34	B42	SERR_L	B89	AD35
A43	PAR	A90	GND	B43	+3.3V	B90	AD33
A44	AD15	A91	AD32	B44	C/BE1_L	B91	GND
A45	+3.3V	A92	RESERVED	B45	AD14	B92	RESERVED
A46	AD13	A93	GND	B46	GND	B93	RESERVED
A47	AD11	A94	RESERVED	B47	AD12	B94	GND

Table A-14. 66MHz, 64-Bit PCI Connectors (Slots 3 through 10)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	TRST_L	A48	GND	B1	-12V	B48	AD10
A2	+12V	A49	AD9	B2	TCK	B49	M66EN
A3	TMS	A50	GND	B3	GND	B50	GND
A4	TDI	A51	GND	B4	TDO	B51	GND
A5	+5V	A52	C/BEO_L	B5	+5V	B52	AD8
A6	INTA_L	A53	+3.3V	B6	+5V	B53	AD7
A7	INTC_L	A54	AD6	B7	INTB_L	B54	+3.3V
A8	+5V	A55	AD4	B8	INTD_L	B55	AD5
A9	RESERVED	A56	GND	B9	PRSNT1_L	B56	AD3
A10	+3.3V	A57	AD2	B10	RESERVED	B57	GND
A11	RESERVED	A58	AD0	B11	PRSNT2_L	B58	AD1
A12	3.3V Keyway	A59	+ 3.3V	B12	3.3V Keyway	B59	+ 3.3V
A13		A60	REQ64_L	B13		B60	ACK64_L
A14	RESERVED	A61	+5V	B14	RESERVED	B61	+5V
A15	RESET_L	A62	+5V	B15	GND	B62	+5V
A16	+3.3V	A63	GND	B16	CLK	B63	RESERVED
A17	GRANT_L	A64	C/BE7_L	B17	GND	B64	GND
A18	GND	A65	C/BE5_L	B18	REQ_L	B65	C/BE6_L
A19	RESERVED	A66	+3.3V	B19	+3.3V	B66	C/BE4_L
A20	AD30	A67	PAR64	B20	AD31	B67	GND
A21	+3.3V	A68	AD62	B21	AD29	B68	AD63
A22	AD28	A69	GND	B22	GND	B69	AD61

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A23	AD26	A70	AD60	B23	AD27	B70	+3.3V
A24	GND	A71	AD58	B24	AD25	B71	AD59
A25	AD24	A72	GND	B25	+3.3V	B72	AD57
A26	IDSEL	A73	AD56	B26	C/BE3_L	B73	GND
A27	+3.3V	A74	AD54	B27	AD23	B74	AD55
A28	AD22	A75	+3.3V	B28	GND	B75	AD53
A29	AD20	A76	AD52	B29	AD21	B76	GND
A30	GND	A77	AD50	B30	AD19	B77	AD51
A31	AD18	A78	GND	B31	+3.3V	B78	AD49
A32	AD16	A79	AD48	B32	AD17	B79	+3.3V
A33	+3.3V	A80	AD46	B33	C/BE2_L	B80	AD47
A34	FRAME_L	A81	GND	B34	GND	B81	AD45
A35	GND	A82	AD44	B35	IRDY_L	B82	GND
A36	TRDY_L	A83	AD42	B36	+3.3V	B83	AD43
A37	GND	A84	+3.3V	B37	DEVSEL_L	B84	AD41
A38	STOP_L	A85	AD40	B38	GND	B85	+5V
A39	+3.3V	A86	AD38	B39	LOCK_L	B86	AD39
A40	SDONE	A87	GND	B40	PERR_L	B87	AD37
A41	SB0_L	A88	AD36	B41	+3.3V	B88	+3.3V
A42	GND	A89	AD34	B42	SERR_L	B89	AD35
A43	PAR	A90	GND	B43	+3.3V	B90	AD33
A44	AD15	A91	AD32	B44	C/BE1_L	B91	GND
A45	+3.3V	A92	RESERVED	B45	AD14	B92	RESERVED
A46	AD13	A93	GND	B46	GND	B93	RESERVED
A47	AD11	A94	RESERVED	B47	AD12	B94	GND

Information on Jumpers

The Information on Jumpers section provides an overview of how to change a jumper settings for any board and provides the jumper block diagrams for the following boards:

- General Procedure to Change Jumper Settings
- Processor Baseboard
- Legacy I/O Board
- I/O Baseboard
- T-Docking Board
- SCSI Backplane Board

General Procedure to Change Jumper Settings

These general instructions describe how to change a jumper setting:

1. Observe all safety and ESD precautions.
2. Turn off all connected peripherals.

WARNING	Make sure that the rack is anchored securely, so it will not tip when the server chassis is extended. Remove the power cords to ensure that the server is not under standby power.

3. Power down the server by pressing and holding the Power button on the Front Control Panel. You may have to hold the Power button down for several seconds. Disconnect all AC power cords to remove standby power from the server.
4. Expose the board on which the jumpers reside. For procedures that describe how to access system boards, refer to Chapters 5 through 8.
5. Locate the configuration jumper blocks on the board.
6. Move jumper to pins specified for the desired setting.
7. Reinstall any boards or components that you had to remove in order to access the jumpers.

Processor Baseboard Jumpers

The jumper blocks on the Processor Baseboard allow you to route Joint Test Action Group (JTAG) Test Data In (TDI) and Test Data Out (TDO) signals through different components on the Processor Baseboard. Additionally, jumper blocks allow you to configure the host bus frequency, set the processor frequency, and set other miscellaneous functions. To access these jumper blocks, expose the top half of the Processor Baseboard by following the procedure in Chapter 6 “Installing an Additional Processor”. Figure A-9 shows where the jumper blocks reside on the top half of the Processor Baseboard.

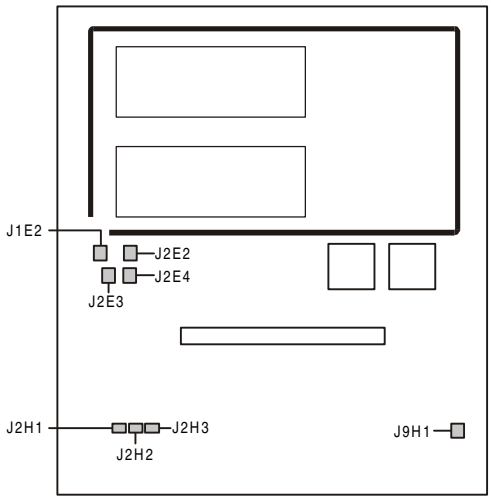


Figure A-9. Processor Baseboard Jumper Locations

Jumpers labeled:

J2E3	JTAG SELECT1
J2E4	JTAG SELECT2
J2H1	Host Bus Frequency
J2H2	Host Bus Frequency
J2H3	Host Bus Frequency
J1E2	Processor Frequency
J2E2	Miscellaneous
J9H1	Miscellaneous

JTAG Select1 Settings

Jumper block J2E3 selects combinations of the processor, supporting chip set, memory, and I/O as routes for JTAG TDI and TDO signals. The default jumper setting allows only JTAG TDI and TDO signals to be routed through the processor. Figure A-10 shows the jumper settings.

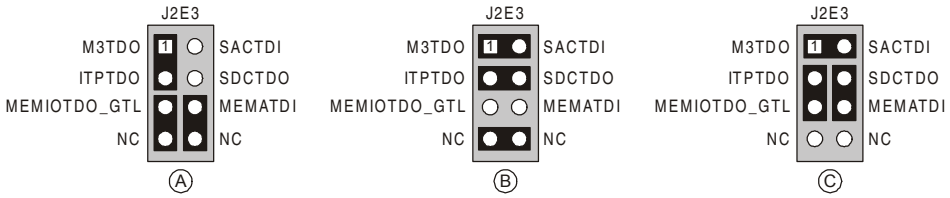


Figure A-10. JTAG Select1 Jumper Settings

Jumper diagram labeled:

A. Processor Only (Default Setting)

B. Processor and Supporting Chip Set

C. Processor, Supporting Chip Set, Memory, and I/O

JTAG Select2 Settings

Jumper block J2E4 adds and skips Processor Board components to the JTAG TDI and TDO signal path. With this jumper you can choose to add memory and I/O, choose to skip Memory and I/O, choose to skip Memory and add I/O, or choose to add Memory and skip I/O. The default jumper setting skips Memory and I/O. Figure A-10 shows the jumper settings.

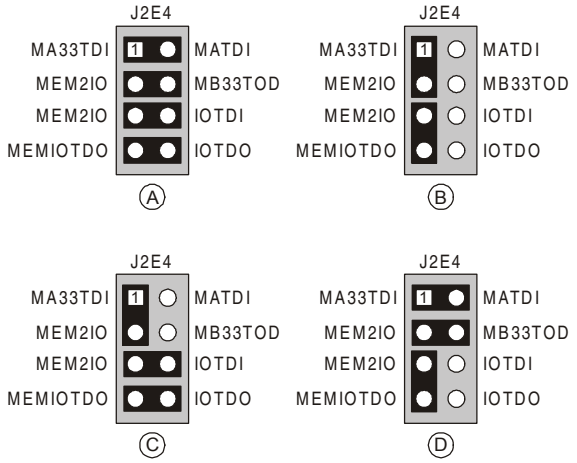


Figure A-11. JTAG Select 2 Jumper Settings

Jumper diagram labeled:

A. Add Memory and I/O

B. Sip Memory and Skip I/O (Default Setting)

C. Skip Memory and Add I/O

D. Add Memory and Skip I/O

Setting Host Bus Frequencies

Jumper blocks J2H1, J2H2, and J2H3 configure the host bus frequency. The settings for all three jumper blocks combine to yield the single frequency. By default, the frequency is set to 133 MHz.

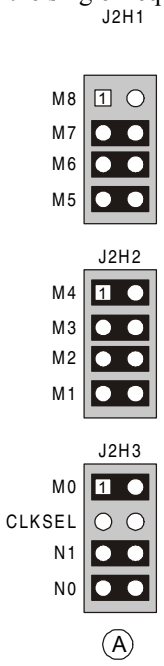


Figure A-12. Host Bus Frequency Settings

Jumper diagram labeled:

A. 133 MHz (Default Setting)

Processor Host Core Bus Ratio

Jumper block J1E2 configures the host-core bus ratio. By default, the bus ration is two to eleven and the core frequency is 733 MHz. Figure A-13 shows the jumper settings.

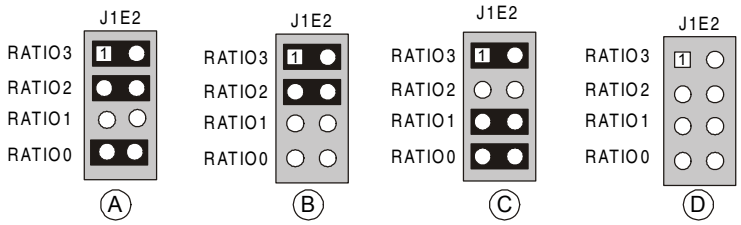


Figure A-13. Host-Core Bus Ratio Settings

Jumper diagram labeled:

A. Two to 10 Bus Ratio with 667 MHz Core Frequency (Default Setting)

B. Two to 11 Bus Ratio with 733 MHz Core Frequency

C. Two to 12 Bus Ratio with 800 MHz Core Frequency

D. Processor Frequency Auto Detect (Default Setting)

Miscellaneous Jumper Settings

Jumper block J2E2 enables server management write protect, configures cache line size, disables the FRB, enables the FSB in common clock mode, applies power to the pullups on the ISP chain for stand-alone programming, and selects between using J1E2 or PCA8550 to set the host core bus ratio. By default, the FSB is enabled in common clock mode, power is not applied to pullups, and the J1E2 jumper determines the host core bus ratio.

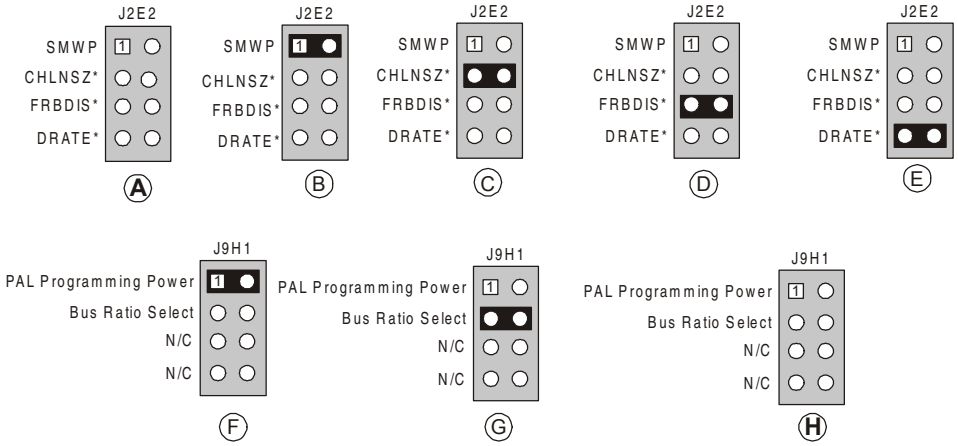


Figure A-14. Miscellaneous Jumper Settings on the Processor Baseboard

Jumper diagram labels:

A. Not Jumpered (Default Setting)

B. Enables Server Management Write Protect

C. Reserved

D. Disables the FRB

E. Enables the FSB in Common Clock Mode (1X)

F. Applies Power to Pullups on ISP Chain for Stand-Alone Programming

G. Processor Frequency Auto-detect BMC

H. Applies No Power to Pullups and Uses J1E2

Legacy I/O Board Jumpers

Jumper blocks exist on the Legacy I/O Board that allow you to perform recovery boot operations, clear the CMOS register, clear the password, and configure FWH programming. To access these jumper blocks you need remove the Legacy I/O Board by following the instructions in "Legacy I/O Board" in Chapter 8.

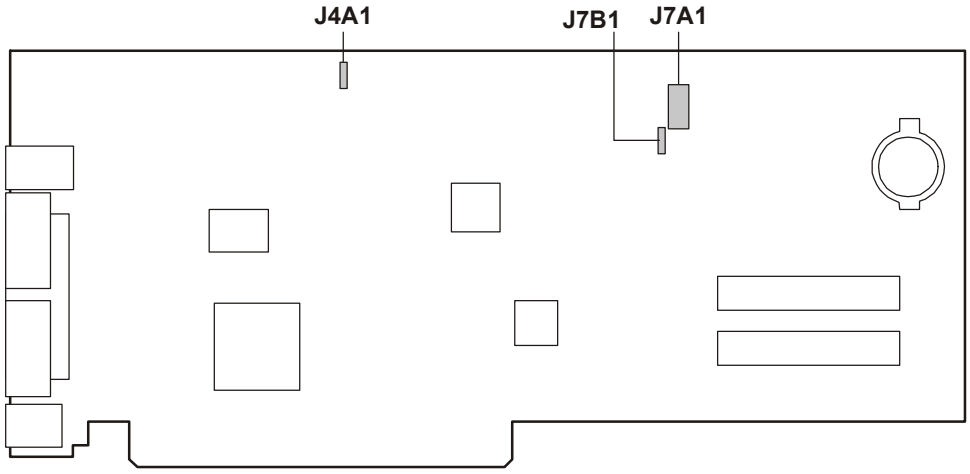


Figure A-15. Legacy I/O Jumper Locations

Jumper labels:

J4A1 FWH Programming

J7A1 Recover Boot, CMOS Clear, and Password Clear

J7B1 Forced MBC Program Mode

Configuring FWH Programming

Jumper block J4A1 allows you to set the FWH programming at 12 Volts. By default, FWH programming is configured for 3.3 Volts.

Figure A-16. Configuring FWH Programming

Jumper diagram labeled:

A. FWH Programming at 12 Volts

B. FWH Programming at 3.3 Volts (Default Setting)

Configuring Recovery Boot

Jumper block J7A1 controls whether the system attempts to boot using the BIOS programmed in flash memory. By default, the system does not perform a recovery boot using this BIOS.

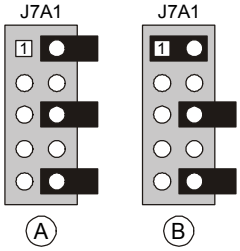


Figure A-17. Configuring the Recovery Boot Process

Jumper diagram labels:

A. Default Setting

B. Use the BIOS Programmed in Flash Memory During a Recovery Boot Procedure

Clearing the CMOS Register

Jumper block J7A1 controls whether settings stored in CMOS nonvolatile memory (NVRAM) are retained during a system reset. By default, the system does not keep the default values in this register. You can configure J7A1 to restore the system defaults.

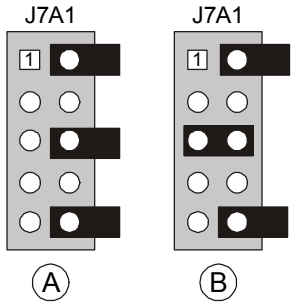


Figure A-18. CMOS Register Clear Jumper

Jumper settings labeled:

A. Do Not Keep Default Values in the CMOS Register (Default Setting)

B. Clear the CMOS Register and Restore the System Default Values

Clearing System Password

Jumper block J7A1 controls whether a stored password is retained or cleared during a system reset. By default, the system retains this password. To clear it you must configure jumper block J7A1.

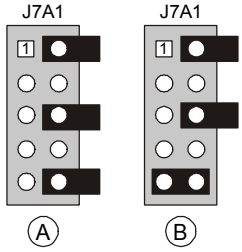


Figure A-19. Password Clear Jumper

Jumper diagram labeled:

A. Retains System Password (Default Setting)

B. Clears the System Password on Reset

Jumper block J7B1 controls whether the BMC is in a firmware transfer mode and forces an update to the BMC code.

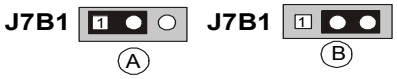


Figure A-20. Configuring BMC Programming

A. BMC Programming Forced

B. BMC Programming non-Forced (Default Setting)

I/O Baseboard Jumpers

Jumper blocks exist on the OEM I/O Baseboard that allow you to include the BMC in the JTAG chain and override the hardware PCI hot plug interlock switches. To access these jumper blocks you need to expose the OEM I/O Baseboard by following the instructions in Chapter 8 "Server Management Boards". Figure A-21 shows the location of the jumpers on the board.

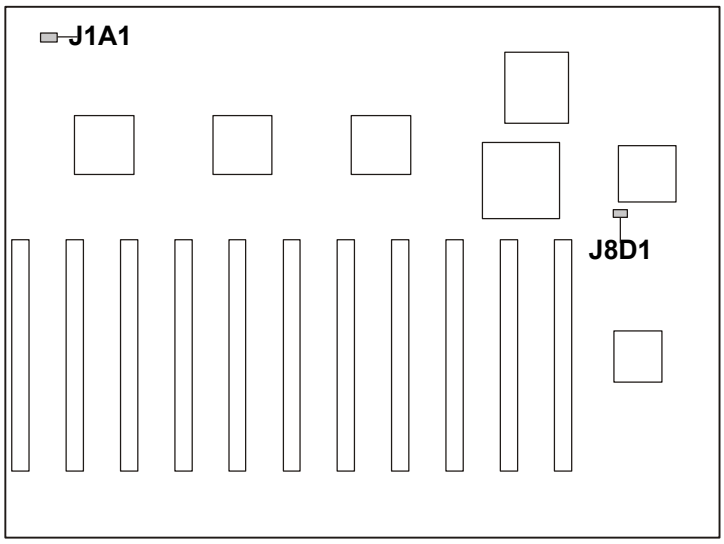


Figure A-21. OEM I/O Baseboard Jumper Locations

Jumper setting labels:

Jumper	Function
J8D1	Include BMC in the JTAG Chain
J1A1	Override the PCI Hot Plug Interlock Switches

Including the BMC in the JTAG Chain

Jumper block J8D1 lets you include or exclude the BMC in the JTAG chain. By default, the BMC is excluded from the JTAG chain.

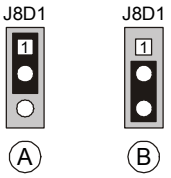


Figure A-22. BMC Jumper Settings

Jumper setting diagram labeled:

A. Excludes BMC from the JTAG Chain (Default Setting)

B. Includes BMC in the JTAG Chain

Overriding the hardware PCI Hot Plug Interlock

Jumper block J1A1 lets you override the hardware PCI hot plug interlock switches. By default, the jumper setting allows for the slot's interlock switch and/or the PID's GPIO27 to set the interlock value.

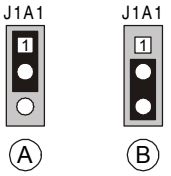


Figure A-23. Hardware PCI Hot Plug Interlock Override Jumper Settings

Jumper settings diagram labeled:

A. Allows the PCI Hot Plug Interlock Switch and/or the PID's GPIO27 to Set the Interlock Value (Default Setting)

B. Overrides the Hardware PCI Hot Plug Interlock Switch

Power Distribution Board Jumpers (T-Docking)

Jumper blocks exist on the Power Distribution Board (T-Docking) that allow you to force a firmware update, flash bootblock write enable, and configure for 220 Volt brownout protection. To access these jumper blocks you need expose the T-Docking Board by following the instructions in Chapter 8, "Server Management Boards".

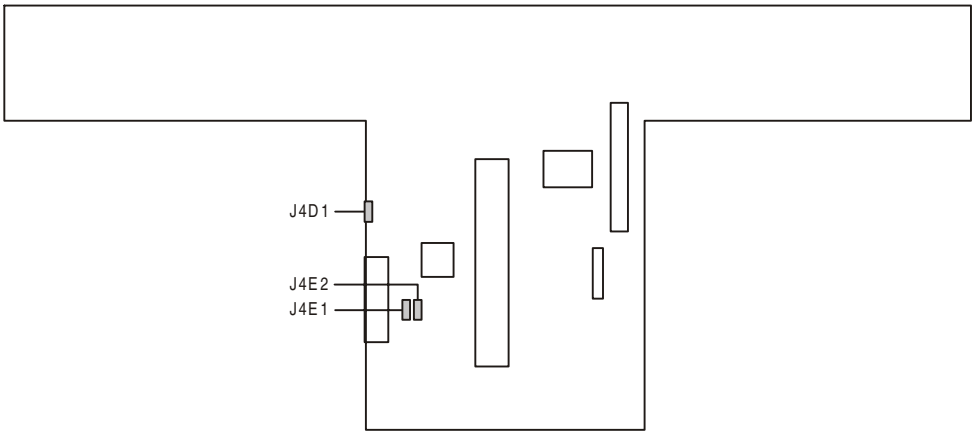


Figure A-24. T-Docking Board Jumper Locations

Jumper setting labeled:

Jumper	Function
J4E1	Force Firmware Update
J4E2	Flash Bootblock Enable
J4D1	220V Brownout Protection

Forcing a Firmware Update and Flashing Bootblock Write Enable

Jumper blocks J4E1 and J4E2 allow you force a firmware update and flash bootblock write enable. By default, both these features are disabled.

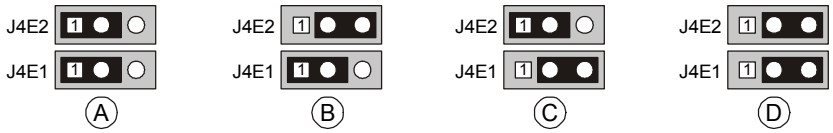


Figure A-25. Firmware Update and Flash Bootblock Write Enable Jumpers

Jumper setting labeled:

A. No Firmware Update or Flash Bootblock Enable (Default Setting)

B. Flash Bootblock Enable

C. Force a Firmware Update

D. Force a Firmware Update and Flash Bootblock Enable

Configuring Brownout Protection

Jumper block J4D1 provides the ability to set the brownout protection for either 110 or 220 Volts. By default, 110 Volt protection is enabled.

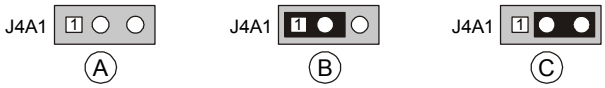


Figure A-26. Brownout Protection Jumpers

Jumper setting diagram labeled:

A. Low Line for 110 Volt Brownout Protection (Default Setting)

B. Low Line for 110 Volt Brownout Protection (Default Setting)

C. High Line for 220 Volt Brownout Protection

Determining DC-to-DC Status

Each DC-to-DC has an LED that indicates whether power is supplied to the DC-to-DC and the health of the DC-to-DC. Table A-15 provides more detail on the LEDs. The LEDs are located on the Sideplane board above the 5-Volt DC-to-DC connector (J6B1).

Table A-15. DC-to-DC LED

AC Power not Present Amber LED	AC Power Present System Powered Off Amber LED	AC Power Present System Powered On Amber LED	Description
OFF			No AC power to any power supply or DC-to-DC
	ON		AC present / Standby output on

OFF	AC present / Standby output on. DC-to-DC outputs on and okay
ON	AC present / Standby output on DC-to-DC failure. DC-to-DC not installed.

B Equipment Log and Configuration Worksheet

Equipment Log

Use the blank equipment log provided here to record information about your system. You will need some of this information when you run BIOS Setup.

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
System			
OEM I/O Baseboard			
Processor Baseboard			
Memory Board (1)			
Memory Board (2)			
Sideplane			
Power Distribution Board			
Hot Plug I/O Board			
Processor Speed and Cache			
Video Display			
Keyboard			
Mouse			
LS120 Drive			
DVD Drive			
Hard Disk Drive (1)			
Hard Disk Drive (2)			
First Installed Power Supply			
Second Installed Power Supply			
Third Installed Power Supply			
Fourth Installed Power Supply			
Hot Plug PCI Slot (1)			
Hot Plug PCI Slot (2)			
Hot Plug PCI Slot (3)			
Hot Plug PCI Slot (4)			
Hot Plug PCI Slot (5)			
Hot Plug PCI Slot (6)			

Item	Manufacturer Name and Model Number	Serial Number	Date Installed
Hot Plug PCI Slot (7)			
Hot Plug PCI Slot (8)			
Non-Hot Plug PCI Slot (1)			
Non-Hot Plug PCI Slot (2)			
12V DC-DC Converter			
5V DC-DC Converter (1)			
5V DC-DC Converter (2)			
3.3V DC-DC Converter (1)			
3.3V DC-DC Converter (2)			
3.3V DC-DC Converter (3)			
Memory Board (1) 3.3V DC-DC Converter (1)			
Memory Board (1) 3.3V DC-DC Converter (2)			
Memory Board (2) 3.3V DC-DC Converter (1)			
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